AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned:—

"Fruit Tree and Grape Vine Pruning," by Geo. Quinn (Horticultural Instructor); price, 2s. 6d.; posted, 2s. 8d.

"Vinegrowers' Manual," by A. Sutherland; price, 6d.; posted, 7d.

Journal of the Department of Agriculture, 1s. per annum in advance; 3d. per single copy to residents of South Australia. Other places, 2s. 6d. per annum.

Any of the following bulletins and leaflets may be obtained by sending a penny stamp for postage:—

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Castration of Colts	XXIX.
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THE AGRICULTURAL BUREAU.—Particulars of this Organisation, of which every farmer should be a member, can be had on application to the Department.

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All communications to be addressed:

"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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R. P. BLUNDELL.
Minister of Agriculture.

POINTS FOR PRODUCERS.

Cases from Locally Grown Timber.

Since 1903, when action was first taken to demonstrate the value of the Remarkable pine timber, 596,529 cases have been cut at the different mills under the control of the Forest Department. The value of these is set down as £20,150 13s. 9d. The report of the Conservator of Forests for the year ended June 30th, 1917, states that the demand for fruit cases has been well maintained during the year, and improved prices have been realized consequent on the higher rates now ruling for most classes of timber. The number cut during the year was 97,061, and of these 66,350 56lb. cases and 15,400 28lb. cases were supplied for dry fruits to Murray River fruitgrowers, as well as 12,725 orange cases; while 2,586 apple cases were sold to the local applegrowers at Wirrabara. Most of these cases were cut at Mount McIntyre mill, but a fair number were supplied from Bundaleer and Wirrabara Forests.

Afforestation.

According to the annual report upon State Forest Administration in South Australia, submitted by the Conservator of Forests (Mr. Walter Gill, F.L.S., F.R.H.S., J.P.,), on June 30th, 1917, the areas enclosed for planting and natural regeneration of the indigenous timber amounted to 21,507¾ acres. During the year under review, the total number of trees planted at all the reserves was 362,870, and of those, 337,722, or 93 per cent., were living; 495¼ acres (exclusive of firebreaks) were planted, the difficulty experienced in getting suitable labor having prevented more extensive operations. A good demand, it was stated, had arisen for dunnage for stacking wheat. The plantations at Wanilla Forest, where the heaviest demands were experienced, proved a useful source of supply for that class of timber for stacking purposes at Port Lincoln. At the Ayers Forest a block of 10 acres of sugar gum, 18 years old, was clear cut during the last two years to ascertain the results to be obtained from subsequent coppice shoots. The poles and firewood obtained from the operations were readily bought at satisfactory rates. The total receipts from the 10-acre block were £108 19s., and the cost of cutting £18 12s. 2d. The resultant growth from the "stools" was thick and vigorous, promising a good return in a few years' time.

Machine Shearing Sheep.

The question as to whether shearing sheep by machine has any ill effects on the roots of the wool or on the skin of the sheep, or whether it impedes in any way the growth of the following crop of wool, is, according to the Wool Instructor (Mr. Henshaw Jackson), at present a contentious one, and, in the absence of reliable data, must remain so.

In reply to a correspondent, he states that his own opinion, based upon personal observation, is that machine shearing on the whole is detrimental to subsequent growth of the wool fibre, inasmuch as machines, unless kept in perfect order, and by reason of the pushing action in their use, tend rather in the direction of pulling the wool out of the skin, instead of the clean cutting of hand shears. Machine shearing takes the wool off very close to the skin, and the action of heat and cold to which sheep may be exposed immediately after being shorn probably has a detrimental effect upon the glands of the skin amongst which are set the delicate hair follicles in which the fibres grow. Scarified cuts, such as are frequent upon machine-shorn sheep, are also worse for the skin than clean cuts by shears. On the whole, he favors shearing by hand; but, at the same time, he admits the usefulness of the machines, and in the absence of reliable tests to prove the questions, they must still remain matters of opinion.

Jarrah in South Australia.

Four attempts have been made by the Forest Department to grow jarrah in this State, and although carefully tried at Wirrabara, Bundaleer, Wanilla, and Kuitpo, it has never developed beyond what is practically the shrubby stage, and therefore valueless from a timber standpoint, says the Conservator of Forests. After a 25 years' trial at the Wanilla Forest, near Port Lincoln, its marked inferior growth renders it obvious that this tree, highly valuable as it undoubtedly is in Western Australia, does not find conditions in this State suitable for its profitable development. While a fair approximation exists here in the special sites selected to the soil and rainfall conditions in Western Australia, the necessary humidity existing in the air seems to be the essential condition which is lacking in South Australia, which, conjoined to the frequent severity of frosts, makes the growing of jarrah commercially impracticable.

Salvation Jane and Wild Turnip.

Two weeds which have forced themselves under the notice of farmers in many districts of late years are Salvation Jane and wild turnip. It has been suggested that both should be proclaimed under the Noxious Weeds Acts. Against the advocates of this course are the landholders who regard the former as useful for grazing, and consequently are disinclined to urge its destruction; and in the case of the latter, perhaps, those who have, either by good management or by good fortune, suffered no inconvenience from the weed. With the idea of securing a representative opinion on the merits or demerits of the two weeds under notice, Branches of the Agricultural Bureau have been asked to reply to a number of questions relating to the prevalence of the weeds, the effect of their occurrence on cultivated or grazing ground, the method of dissemination of the seeds, and means, if any, of checking the distribution of the plants where such a course is deemed desirable.

Wool.

The value of the wool exported from Australia during the year 1915-16 was £26,854,091. For the past five years the total value of the wool exported has been over 26 million pounds per annum. During the five years ended 1915-16 the United Kingdom took £59,056,693 worth of our wool; France took £21,620,780; the United States, £13,197,247; Belgium, £7,607,277; Japan, £5,987,056; and Italy, £3,565,109. In pre-war days, Germany obtained about five million pounds' worth of Australian wool annually, and Austria-Hungary also afforded a market on a smaller scale.

Ensilage.

Considerably less attention is given the manufacture of ensilage in this State than is the case with New South Wales and Victoria. In New South Wales during 1915-16 18,511 tons were ensiled on 130 holdings, whilst in Victoria during the same year 269 landholders preserved 16,356 tons of fodder in this manner. South Australian farmers ensiled 1,688 tons of green stuff, and this was put down on 43 farms.

Seed Wheat, Oats, and Barley.

The importance of sowing seed true to name is generally recognised amongst agriculturists in this State, and in order that they shall be able to secure reliable seed of wheat, oats, and barley on each of the Government experimental farms a fair amount of time is devoted to the production of seed. For the coming year's sowing, farmers will be able to secure the following varieties from the farms mentioned.

Booborowie—Wheat: Federation, Yandilla King, Marshall's No. 3, Queen Fan, Onas, Caliph, King's Red, Gluyas; Oats: Scotch Grey; Barley, Shorthead.

Turretfield—Wheat: Federation, Yandilla King, White Essex, Leak's Rust-proof, Queen Fan, Marquis, Firbank, Gluyas, King's White, King's Red, Comeback, Red Russian, Basil, Avoca, Triumph, American No. 8, Le Huguenot, Bayah; Oats: Scotch Grey, Burpee Welcome, Golden Rain, Conqueror, Giant; Barley: Shorthead.

Veitch—Wheat: Queen Fan, King's Red, College Eclipse, Gluyas, Late Gluyas, Bearded Gluyas.

Eyre's Peninsula—Wheat: Gluyas, King's Red, Queen Fan, Caliph, College Eclipse; Oats: Scotch Grey; Barley: Shorthead. Limited quantities of the following wheats will also be obtainable: Ford, Anvil, Canaan, Exquisite, Fane, Forge, Fortune.

The seed grains submitted for sale by the Roseworthy Agricultural College comprise a number of early, mid-season, and late wheats and barleys, a mid-season variety of oats, and a small quantity of field pease. The cereals have all been selected from pure strains, and well graded. The production of selected and graded seed has been continued at the College for over 12 years; hence most of the strains now being offered possess unbroken pedigrees of considerable length. A catalogue of varieties and prices is to be seen in the advertisement section of the *Journal*.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

VETERINARY INQUIRIES.

"S.," Sandalwood, has horses with bad cough when starting to eat or drink, with rattle in windpipe like asthma. Much white, yellow, or green pus from nose; ears droop, appetite poor, thirst; no pain, but just stand about.

Reply—A reader of the *Journal* would have recognised in the above symptoms an attack of pneumonia, and in this case it is probably the contagious form common in the mallee, and connected with parasites conveyed to the system by flies. Treatment—No work till well. Steam head with hot bran containing a teaspoon of eucalyptus oil, gum leaves, or turpentine; do this once a day till discharge ceases. Feed lightly on bran and hay. Mix a teaspoon of saltpetre with a like amount of Stockholm tar and honey, and place on teeth three times a day. For fuller details see bulletin, "The Horse."

"W. A. T.," Juna, W.A., has a gelding, seven years, generally good worker, but in hot weather is very much distressed.

Reply—It is impossible to say what is the cause of distress without an examination, but a very probable one is injury to the arterial walls from previous attacks of parasites such as bloodworms. He might find relief from water dashed over his face when very distressed and 10 drops of tr. belladonna morning and evening for a fortnight or so when so very distressed. The feeding and salts are all right, and may be continued, but he will do best with small feeds and often, and those damped.

"F. C. T.," Meribah, has a mare, does not sweat in heat of day, but blows hard; and filly with scum on eye.

Reply—It is impossible to diagnose mare's ailment without an examination, but as possibly she is asthmatical, good results would follow a tablespoon of Fowler's solution of arsenic in food morning and evening for three weeks. Kindly report progress in a month or so. Filly—The eye may be opaque from anaemia or former injury; it may recover without treatment, but possibly a few drops of a solution of nitrate of silver, 2grs. to the oz., dropped into the eye daily might help.

"A. T. G.," Inman Valley, has a cow with gradual falling off in milk, loss of condition, groggy; dung soft, dark, slimy, and little of it; urine high color. Eyes dull, mouth yellowish and bloodless.

Reply—The symptoms point to parasitical anaemia from hydatids or fluke, and treatment is not likely to be of much benefit unless carried out by a veterinary surgeon. Try 2ozs. compound syrup of phosphate of iron and two drams etherial extract of male fern in a pint of red wine each morning for a week, and report progress. The drugs are scarce and very dear.

"T. L. D.," Jamestown, has horses pimply and sore fetlocks.

Reply—The trouble is due to small parasites, and is to some extent contagious. The matter will mend if the fetlocks are dressed each evening with one part benzine to five parts olive oil. Also give a dessertspoon of sulphur in feed once daily for 10 days.

Clarendon Agricultural Bureau reports young pigs stiff, and died after castration; sows of litter also stiff.

Reply—Very probably a form of blood poisoning, which occurs in pigs a few weeks old, due to a germ, and known as *Pasteurellosis.* Prevention, cleanliness and warmth. Treatment, antiseptic washes to wounds and a teaspoon of photographer's hypo in milk or mouth with water once or twice daily for a week or so. Should other cases occur send a carcass as fresh as possible for examination, preferably to arrive on a Friday.

"W. W.," Yeelanna, asks would harm result if sheep were paddocked on kale and stinkwort?

Reply—The reply depends on the relative proportions of the two, generally the stinkwort outdoes the kale; in that case stinkwort would cause the ordinary acute digestive trouble associated with it. If the kale is a great crop, the sheep will not trouble about the few heads of stinkwort, nor will they trouble the sheep.

"S. H. S.," Naracoorte, seeks particulars as to treatment of lambs with scabby feet.

Reply—(*a*) Treatment, when in small numbers, rub scabs with damp bluestone, and dab on Stockholm tar, one or two dressings suffice. When in large numbers, walk through race with inch or two of slaked lime with 2 per cent. bluestone. (*b*) Complaint is contagious, being due to mange parasites, probably *Sarcoptic acari,* or *trombidii,* though possibly arising from ulcerative germs; a microscopical examination is necessary to decide which. (*c*) Scabby feet and mouths in Naracoorte district are usually caused by same parasite, but if ulcerative, by different ones. (*d*) The parasites infest pastures, especially scrubby or ferny. (*e*) Healthy lambs would probably become infected by following affected ones on such pastures. (*f*) Change of pasture is good for infected lambs. (*g*) Scrub or fern is more harmful than either wet or dry pasture; dry, however, is better than wet. Wherever practicable, lime-spraying a pasture will clean it up.

"J. H. W.," Yeelanna, has a yearling filly, with soft swellings on knees.

Reply—These are probably synovial distensions, and point to want of balanced ration for growing animal. They will probably be permanent, but may be reduced somewhat by rubbing into them daily a little blue mercurial ointment. Improvement may also follow the administration of a tablespoon of compound syrup of phosphate of iron in food once or twice daily for a month.

"R. L. W.," Arno Bay, has a draught bay gelding, 13 years, with stiff neck and little stiff all over; difficulty in getting mouth to ground, but eats well from manger; little hard lumps on sides of neck.

Reply—Thanks for diagrams, which are of great use. From the symptoms described I am inclined to think that the horse has a slight attack of tetanus. The hard lumps described being the transverse processes of vertebrae, prominent on account of spasm of muscles. Do not attempt local treatment for them, but let him have 6ozs. to 8ozs. Epsom salts daily in feed or water, and there will be a good chance of recovery in a few weeks. The treatment may be stopped as the stiffness eases off.

"L. G. G.," Clanfield, seeks information *re* supplying cattle with bone meal.

Reply—Any good brand of bone meal such as the one you mention is suitable. There is practically no risk of carrying disease, on account of the method of manufacture. A handy way to give it is to mix four parts of bone meal with one part of saltpetre, and place in a box protected from the weather, and allow the cattle to use it as a lick. If they do not take kindly to it, put a handful in their mouths once a day till they do.

"H. E. P.," Nadda, reports Berkshire boar, troubled with cough and discharge from nostrils.

Reply—He has probably got an attack of catarrh. Smear a little Stockholm tar on his nose occasionally, and give 10 drops tr. nux vomica in a little honey or jam twice a day for a week.

"M. & Co.," Murray Bridge, have cows which were removed from swamps on account of flood, are fed with 20lbs. oaten chaff, 8lbs. bran, and a little lucerne hay daily; digestive troubles feared on account of change of diet.

Reply—Such troubles have already appeared on the banks of the Murray. It would be better to reduce the chaff, giving the balance, or a little more, as hay with the lucerne hay; by so doing impaction of the rumen will be avoided. Probably a pound daily of linseed cake or meal would be useful. I do not altogether advise a lick for general use unless the cows begin to show digestive trouble by costiveness and malaise. A cheap and efficient lick is composed of 50lbs. coarse salt, 20lbs. slaked lime, 15lbs. ordinary super., 10lbs. saltpetre, 5lbs. sulphur. If administered instead of as a lick 4ozs. per cow daily in feed.

"J. P. S., Tarcowie, has a horse with splint.

Reply—A recently-forming splint as described may be absorbed by the daily application of a few drops of liquid blister, but a better way of bringing this about is to rub it daily for a few minutes with a smooth stick, such as a spoke. A splint does no disqualify for a Government certificate, and in a heavy horse is a matter of small importance, as it will be absorbed as years pass.

"G. J. A.," Carrow, Port Neill, has cows which are in pain, pass watery dung, get down, and die after a few days.

Reply—Although not mentioned, they probably pass red water, too. The symptoms are those of parasitic blood failure. The lick would be improved by the addition of one-tenth part saltpetre, and as an emergency medicine a pint of red wine with a stick of cinnamon and half a nutmeg ground up in it and given two or three times a day will help. Being in such an out of the way spot it would be well to keep a few medicines at hand.

"L. D. H.," Port Broughton, has a filly with growth on fetlock.

Reply—The growth, as you suspect, should be cut off, but as it is of a fibrous nature, may grow again. If you can get a wax end tightly round it, do so, and let it slough off, but if this cannot be managed, it had better be seared off with a red-hot iron, and in either case dressed afterwards with one part chloride of lime to seven parts slaked lime daily.

"R. G. H.," Yaninee, has a horse which fell suddenly very lame while scrub rolling, nine weeks ago. Swelling front of pastern off side hind; opened and discharged pus.

Reply—There is every likelihood that a stake has penetrated where the swelling occurred. Cast horse, open where it broke, probe for wood, which, if detected, must be cut down upon and removed; there will be more than one piece, probably. Then dress daily with Stockholm tar till well.

"G. E. V.," Coonalpyn, has a filly, three years, in foal; stiff, running on self-sown oats.

Reply—The trouble is a form of laminitis connected with the feed and being in foal; but little can be done until after foaling. It may do some good to let her have 10 drops tr. pulsatilla each morning and 10 drops tr. belladonna each evening. If these are dropped on a little bran on top of feed she will take them all right without handling. Keep them up till she begins to show signs of parturition.

AGRICULTURAL INQUIRY.

[Reply supplied by Superintendent of Experiments, Mr. W. J. SPAFFORD.]

Nantawarra Agricultural Bureau.—With the disease "take-all," after the spore germinate they send out numerous threads into the surface roots and bases of th stems of the wheat plants. These very numerous threads continue to use up th sap that should have gone to develop the wheat plants until they have reache maturity, which stage can be recognised by the appearance, between the stalk an sheath of the last internode of the stem, of a brownish-black powder. This powder mass on the bases of the stems is the surest indication that the wheat plants wer affected by "take-all." The roots of affected plants have the appearance of bein more or less decomposed.

THE GENERAL MANAGEMENT AND BREEDING OF PIGS.

[An address delivered at the Annual Agricultural Bureau Congress by W. J. Colebatch, B.Sc. (Agric.), M.R.C.V.S., Principal Agricultural College, Roseworthy.]

(Continued from page 388)

PARTURITION OR FARROWING.

It may be said of sows, as of all other breeding stock, that the less interference on the part of the owner or manager whilst the process of parturition is going on satisfactorily the better for the mother and her offspring. When sows have been properly looked after throughout gestation there will not be any call for assistance in one-half per cent. of the cases of parturition amongst breed sows. Normally, the labor pains, which at first are very slight, but subsequently become very violent and convulsive, lead to the expulsion of the litter without the least difficulty. In a quick birth the young pigs follow one another at intervals of 10 to 15 minutes, but it may happen that they come at irregular times, the process extending over 18 hours to 24 hours, or even longer.

Shortly after the birth of each pig, its covering membranes should be cast, and when the last pig has been born the after pains bring about the expulsion of the placenta, which should be promptly removed and disposed of. When difficulties do arise, and assistance is required, it should be given without a moment's loss of time, as even when taken early, obstructions to free birth are difficult to remove in animals of this size.

By evacuating the bowels, and making use of both the alimentary and genital passages for digital operations, the process may be facilitated, but in the more difficult cases individual ingenuity and improvisation of specially adapted contrivances must be relied upon to a very large extent. Where assistance has been given, or where the young pigs are sickly, a teaspoonful of whisky or gin will have a restorative and stimulative influence, and will revive those near the point of exhaustion.

When sows over-farrow, that is produce more pigs than they possess teats for, or if it is considered that they are not fit to rear the whole litter, the surplus may be worked on to a foster mother. In any case, even if it involves the slaughter of some of the litter, sows should not be allowed to rear more than they are able to nurse well. For young pigs, from six to eight is sufficient, and mature sows may be allowed up to 10 or even 12 in the case of particularly good mothers. When reducing the size of the litter, it should be remembered that with sows nursing for the first time, it is advisable to leave as many as possible within reason, in order to develop the udder in preparation for subsequent litters.

In nearly all litters there are one or two undersized pigs, which by force of competition are driven to the back teats, and since these are never so abundantly supplied with milk as those in front, the weaklings do not get a chance to make up the handicap with which they began, but fall further and further behind. These "parson's pigs," as they are somewhat irreverently termed, are rarely worth the rearing, unless they can be transferred to a good nursing sow that has a short litter.

GENERAL MANAGEMENT OF BOAR.

During the period of active growth the boar's diet should be of a character that will encourage the development of frame and masculinity, without over-stimulating the inherent aptitude to fatten. For the first month after weaning, the young boar may be allowed to run with the rest of the litter, but when three months old he should be placed in a separate enclosure, and given such attention as is fitting for a pig destined to become the head of a herd.

At from eight months to 10 months, according to development, he may enter upon his stud duties without detriment, provided he be judiciously mated. By this is meant that the number of sows must be gradually increased, until he is rising two years old, when he may be considered to have attained to sexual maturity.

Boars are rarely retained more than three to five years in a herd, as they become too massive and unwieldy. Moreover, they get slower at their work, and in small herds their retention for a longer period would mean more or less inbreeding. Another point of some importancy in most people's minds is that old boars, even though they have their tusks cut, are inclined to get savage and troublesome to manage. The disposal of these surplus boars, however, is not a very easy matter, as a rule, and the operation of castration demands a degree of agility on the part of the operator that does not tend to popularise the system of converting them into "stag" pork. On the whole, however, I think this is in the end the most economical way of solving the problem.

THE FEEDING OF PIGS.

Of all farm animals, pigs turn to profit the highest proportion of food consumed. This statement is based on the experiments conducted at Rothamsted by Lawes and Gilbert, the results of which are here shown:—

Table II.—*Showing the Digestive Capacity of Pigs, Comparatively with those of Ruminants.*

	Per 1,000lbs. Live Weight per Week.			Required to Produce 100lbs. Increase.	
	Dry Food Consumed. lbs.	Digested Organic Matter. lbs.	Increase in Live Weight. lbs.	Dry Food. lbs.	Digested Organic Matter. lbs.
Oxen	125	88	11.3	1,109	777
Sheep	160	121	17.6	912	686
Pigs	270	227	64.3	420	353

The above figures reveal the great superiority of the pig as an economic transformer of food into saleable increase, but the difference is, of course, due in a large measure to the concentrated and easily digested character of the food, and to the fact that Nature has fitted pigs with a digestive apparatus which enables it to absorb quickly large quantities of easily assimilated foods without suffering any ill effects. On the average, the improved breeds, when judiciously fed, will lay on fat at the rate of from ¾lb. to 1½lbs. per day.

The rate of fattening and the cost of producing the increase varies with the age and development, as shown in the following summary by Henry of Wisconsin.

Table III.—*Showing Influence of Development on Rate of Fattening.*

Weight of Animal. lbs.	Total No. of Animals.	Average Feed Eaten per Day. lbs.	Feed Eaten Daily per 100lbs. Live Weight. lbs.	Average Gain per Day. lbs.	Feed per 100lbs. Increase. lbs.
15 to 50	174	2.23	5.95	.76	293
50 to 100	417	3.35	4.32	.83	400
100 to 150	495	4.79	3.75	1.10	437
150 to 200	489	5.91	3.43	1.24	482
200 to 250	300	6.57	2.91	1.33	498
250 to 300	223	7.40	2.74	1.46	511
300 to 350	105	7.50	2.35	1.40	535

These figures represent the mean results of a large number of trials, and from them we may conclude—

1. That the amount of food required rises as the size of the body increases.

2. That the average gain per day increases with age.

3. That the weight of food required to produce a given increase in live weight is very much higher in the later stages of the fattening process than at the beginning. This is due in part to the additional food needed to maintain in healthy condition the increased carcass, and in part to the replacement of water by fat as the tissues become charged almost to the limits of their capacity for holding fat.

The practical importance of these trials is that they demonstrate clearly that the cost of production increases considerably as the fattening process is prolonged, and hence it follows that when there are no special reasons for doing otherwise, it pays to feed liberally, and thus to render the time occupied in the fattening pens as brief as possible.

SUCKERS.

Passing now from general considerations to the details of pig feeding, we will review briefly the requirements of pigs at different stages of development.

Taking first the young pigs, whilst suckling the mother; for the first two or three weeks the litters will be fully satisfied with the mother's milk; but if anything serious should happen to the sow, the young pigs may be reared on warm cow's milk, to which a little sugar is added. The quantity of sugar may be varied as required, being increased if there is evidence of constipation, and gradually reduced should the bowels be unduly relaxed. Care should be taken to avoid over-feeding suckers, as they are easily upset, and each disturbance of the system gives a check to development. Like all young animals, they should receive their food in small quantities several times a day, and the troughs must be kept scrupulously clean.

When about a fortnight or three weeks old, the young pigs will benefit if the mother's milk is supplemented with small amounts of easily digested food, and for this purpose nothing can surpass a mixture of skim or separated milk and pollard. This ration should be steadily increased, till the sow is weaned off, which will generally be seven or eight weeks after farrowing.

WEANERS.

If they have been properly managed, suckers will pass into the weaning stage without check. Those that are intended for breeding purposes will be treated differently to the market pigs from this time onward. They will require a ration that is richer in "flesh formers," but less fattening than that given to those being prepared for market. Whenever possible, separated milk and crushed wheat should be given, as wheat is relatively rich in albuminoids and phosphates, and the milk supplies lime. Pea meal is also a suitable ingredient, but should not be fed in excess, or ill effects may follow.

When three months to four months old the young breeding sow should be turned out to graze, and maintained in good thrifty condition with a limited quantity* of meal or crushed grain, the skim milk now being omitted. After becoming pregnant, the sow should have the grain ration gradually increased, and when a few days off farrowing the sow is brought into the sty, she should be put on a more sloppy and richer diet, with a view to staving off constipation and stimulating the activity of the mammary glands. Separated milk with a mixture of meal and grain will meet requirements.

During the nursing period the same ration may be continued, and the amount fed should be steadily increased, until just before weaning, as the most critical time is the fourth or fifth week, when the lusty young family is just beginning to wean itself. Just before the mother is withdrawn from her litter, the quantity of meal should be reduced, and from weaning onwards she will gradually revert to the diet previously recommended for dry sows running on pasture.

Boars are usually better treated during the period of growth than the sows. The ration is more concentrated, being richer in albuminoids, such as crushed oats and crushed peas. When they can be kept on pasture they will do well on a crushed grain allowance, but when confined in sties they should receive, in addition, a daily supply of green feed or roots. This not only cheapens the cost of the boar's upkeep, but also improves his general health and ensures a plentiful supply of minerals.

THE FATTENING PROCESS.

Under the modern system of management, which does not recognise the necessity for the store pig stage in the production of bacon, weaners enter upon the fattening process immediately they are separated from the mother. They may be fed in small yards at first, and later on they should be brought into sties in small lots and topped off for market.

The ration will have to vary in accordance with the foods produced on the farm and the relative values of such feeds as are being offered for sale. The great bulk of the pigs in this State will be fattened on wheat, barley, peas, or potatoes, with or without milk offal and dairy by-products. In the early stages, nitrogenous foods, such as milk, peas, lucerne, or wheat offal should be largely represented in the ration. The effect of these fodders is to promote physical development, and also to further the production of lean meat before the accumulation of fat has gone too far. It should be remembered, however, that there is a limit beyond which these nitrogenous foods cannot be used without causing irritation in the kidneys, as well as other consequential disorders. Under our conditions those who are able to obtain separated milk and buttermilk will doubtless feed them in conjunction with barley or wheat, and I do not think it possible to produce better-quality pigs than those raised on this ration and topped off with an addition of cracked peas or pea meal. Where dairy byproducts are not available, wheat is a better food than barley for young weaners, as it is richer in albuminoids, and on most of the wheat-growing farms there will frequently be a shortage in the supply of foods derived from milking cattle. First-class porkers and baconers, however, can be reared on wheat, pollard, peas, and kitchen refuse if they be cleanly and regularly fed. Better results are obtained by blending several different foodstuffs together, and it is stated by experienced men in England that green feed—clover, lucerne, rape, mangels, &c.—should form up to 10 per cent. of the total ration. Where there is a wide choice of food materials, and these precepts can be followed at will, it is possible to obtain an average daily gain in weight of 2lbs. or over.

In this State, however, we are restricted in the choice of foods, and we have also to give more attention to the cost of preparing the foodstuffs; but even on simple diets, a regular daily increase of about 1lb. a day should be secured in non-dairying districts, and practically all the fattening pigs should reach the market under one year old.

PIG FOODS—CEREAL AND PULSE GRAINS.

The best results in fattening pigs with grains are obtained with barley. This grain induces rapid fattening, though in this respect it is hardly the equal of maize, and it yields a high-grade carcass, with firm white fat intermixed with fine-grained lean meat. It is the most popular pig food in Great Britain, where it is commonly fed in conjunction with pollard and pea meal. Experiments have shown that maize produces 8 per cent. more gain than barley, but the maize-fed carcass is very deficient in quality, being soft, flabby, and greasy; and hence of lower value. Maize, however, is sometimes an economic food to use during the middle portion of the fattening period, provided it does not constitute more than 50 per cent. of the ration. Its use should be discontinued two weeks or three weeks before the pigs are topped off, and they should be finished on a ration containing barley and peas.

Wheat is not largely used in pig feeding in older countries, as it is usually too dear; but on South Australian farms there is generally a surplus of second-grade wheat or screenings that can be converted into bacon very profitably. It is eminently adapted to supply the needs of growing pigs, and when fed to fatten animals, it is found to be equally as efficient as maize, with this advantage, that it imparts a good color, firm texture, and pleasing appearance to the carcass. Oats contain too high a percentage of indigestible fibre to meet the demands of the fattening pen, but they may be used to improve the milk flow of nursing sows or to maintain the vigor of the boars. It is claimed by Danish investigators that rye is almost equivalent to barley as a fat-producing food for pigs, but care should be exercised in using it for protracted periods, for it is not appreciated by pigs to the same extent, and if fed alone inappetence follows, and the rate of fattening will decline. As an ingredient of a mixture of grains, it is satisfactory, and the quality of the meat produced is said to be quite up to the standard of a barley-fed carcass.

Peas are largely used in the final stages of fattening, either alone or in mixture. They cause the fat to be laid on at about the same rate as maize, and they furnish the highest quality pigs on the market. The meat is beautifully firm and sweet, and is well interleaved with lean. They are too rich in nitrogen and, as a rule, too costly to feed heavily throughout the major portion of the fattening period, unless it so happens that they have been grown as a crop to be grazed. This is one of the best and cheapest means of marketing peas, which is always a more or less troublesome crop to harvest. In 1915 I grew a 10-acre block of dun peas at the College, and treated them in this way, with the result that the field returned well over £10 an acre, and there was a very considerable saving in the cost of management of the herd.

Last season I took care to have the details of the pea-grazing carefully recorded, and I found that from a paddock of 3.57 acres on to which pigs, to the number of 57, were turned at intervals, the total gain in weight was 1,970lbs. If we place on this increase a value of 6d. per lb., which is below the rate ruling at the time the pigs were available for sale, the average gross returns per acre works out at £13 17s. 3d. The cost of growing the crop was about £2 2s. an acre, thus:—Ploughing, 6s.; harrowing (2), 2s.; drilling, 2s.; seed, 2bush., 12s.; superphosphate, 2cwt., 10s.; rent, 10s.; total cost per acre, £2 2s.

The net profit will therefore be represented by £11 15s. 3d. per acre, and for every penny difference in the market value the net gain will increase or decrease as the case may be by £2 6s. 3d. This method appears to me as a simple, effective, and economic system, and I strongly recommend those who are located in pea-growing districts, and have not hitherto tried it to do so at the first opportunity. The crushing and grinding of all grains increases their feeding value to some extent. In the case of the small grains, the saving effected is more than 10 per cent., and with maize about half that amount. The advisableness or otherwise of doing so, therefore, will depend upon the ratio of the cost of converting the grain into meal to the value of the grain saved. With hard grains there is clearly an advantage in soaking for 12 hours to 24 hours before feeding, but the evidence is less satisfactory with regard to grain meal, some authorities contending that fresh meal will give equally as good results fed dry as when soaked in water. On the average it is found that from 4lbs. to 5lbs. of the cereals are required to produce 1lb. of gain in live weight.

Pollard is undoubtedly one of the best foods for weaners and slips. It supplies just the right materials for building up the young bodies and does not overhasten the fattening process. It is an auxiliary foodstuff for fattening pigs, being too expensive as a rule to use by itself, and even if it were cheaper, it would be better practice to mix it with more fattening feeds. Bran is not very suitable for pigs, being too fibrous and coarse; and practically its only use is as a corrective to mature breeding stock.

DAIRY BY-PRODUCTS.

Skim milk is *par excellence* the best food for young pigs: in fact, without it there is always a danger of the weaners suffering a set-back, that will seriously impair their fattening propensities. It may be fed at any stage of growth, but the profit returned will be greatest when given to young stock. The usual mistake is to feed it in excessive quantities, and thus to cause digestive disorders. Skim milk is most profitably consumed when fed with meal in the proportion of one of the latter to two or three of the former. The appended table, which summarises 19 trials, illustrates the point.

TABLE IV.—*Showing Effectiveness of Skim Milk, when Fed with Meal in Varying Proportions.*

Meal.	Milk.	Pounds of Milk Equivalent to 100lbs. Meal.
1lb.	1lb. to 3lbs.	327
1lb.	3lbs. to 5lbs.	446
1lb.	5lbs. to 7lbs.	574
1lb.	7lbs. to 9lbs.	552
	Average of 19 trials	475

It is found that the mixing of skim milk with meal is also of benefit, inasmuch as the practice is attended by an increase in the digestibility of the meal. It has been calculated that skim milk or separated milk is worth about 1d. per gallon fed in this way, so that the cows must be credited with from 30s. to 35s. extra return where this system is in vogue. Buttermilk is practically equal in value to separated milk, but experiments with whey showed it to be worth less than half as much.

GREEN CROPS—ROOTS AND POTATOES.

A good stand of lucerne will carry from 10 to 15 fattening pigs per acre, and it has been demonstrated at Missouri Experimental Station that approximately 600lbs. of gain per acre was due to the green forage. Valuing this at 6d. per lb. we get a return per acre of £15. Whether or not these results could be regularly obtained or not, it is quite certain that where good lucerne swards can be established they will help to cheapen the cost of fattening very considerably. Rape is also suitable for grazing with pigs, but it would take roughly two acres of rape to equal one acre of lucerne in the production of marketable increase.

Of the roots, it may be said that any of them are serviceable in small amounts. The Danish investigations have shown that 100lbs. of barley is equivalent to about 700lbs. of mangels. Carrots, turnips, and mangels are approximately equal in food value, but the "root of scarcity" is more appreciated by the pigs. Roots exercise a useful function in relieving the monotony of the continuous meal and grain ration, and it is the general experience that pigs are invariably healthier and thriftier when in receipt of a few roots.

Potatoes are frequently used for pigs in districts where they are grown, and in contiguous areas. Raw potatoes should never be fed, as they almost invariably cause diarrhoea and intestinal derangement. When boiled, however, they produce no baneful effects, and may be freely used. Potatoes are practically the only foodstuff that is ever boiled nowadays, as the old idea that cooking and steaming increased the rate of fattening, has been proved to be entirely erroneous. The green sprouts of potatoes are particularly dangerous, as they contain toxic amounts of an alkaloid known as "Solanin," and hence potatoes that have begun to germinate should be viewed with suspicion. From 4lbs. to 4½lbs. of potatoes are required to produce the same amount of gain as 1lb. of grain, but when comparing potatoes with other feeds from the economic standpoint, the expense of preparing them for use must not be ignored; on the other hand the stimulus to appetite resulting from the introduction of a new class of feed will have to be placed to their credit.

Potatoes are deficient in both flesh formers and phosphate of lime, and therefore if fed at all to young stock, they should form only a small proportion of the whole ration. For fattening stock, however, which require large quantities of carbo-hydrates, they are better adapted, and for this purpose they may be combined with dairy by-products or grains. When judiciously fed, the quality of the bacon produced leaves nothing to be desired.

CONCLUSION.

In concluding these remarks on pig-feeding, I wish to emphasize the fact that no amount of experimentation or research can ever absolve the pig herdsman from the necessity of watching closely the effects of the different rations on the particular class of pig he is breeding and of varying them to suit the purpose he has in view. The "standards" must not be regarded as anything but guides to the compounding of rations, and all rules laid down, either as the result of experiments or prior experience, must be subservient to the logical conclusions from more recent observations and an intimate practical knowledge of local circumstances.

LUCERNE SEED.

The period over which lucerne seeds retain their vitality varies with methods and conditions of harvesting, storing, &c., says the Botanical Assistant (Mr. H. W. Andrew), in reply to a correspondent. Lucerne seeds generally retain a satisfactory sprouting power for from four years to five years, after which there is considerable deterioration, although it may be found that a few seeds will sprout some years after. Lucerne seed has been kept in various gases by a European experimenter, and after 16 years yielded 50 per cent. sprouts. Whenever any doubt arises as to the sprouting capacity of any lot of seed, the best plan is to have it tested in a seed germinating chamber. A small sample of such seed sent to the Department at any time can be so tested free of charge.

COW-TESTING ASSOCIATIONS.

Herd testing has received a good deal of attention in the United States of America. The first co-operative cow-testing association was formed in the State of Michigan in 1916, and at present there are 455 such bodies distributed throughout 37 States. In Wisconsin alone there are 81. In all, 11,720 herds are under test, the number of cows being tested totalling 211,966.

DISEASES OF THE VINE.

ANTHRACNOSE (BLACK SPOT) (*Manginia ampelina,* V. and P.)

[By H. E. Laffer, Viticultural Instructor and Lecturer at Roseworthy College in Viticulture, Fruit Culture, and Oenology.]

The recurrence of Black Spot among the vineyards of South Australia has been sufficiently serious in the past two seasons to cause vinegrowers to view with alarm the increasing severity of the outbreak. Under the benign influence of our climate we are, as a rule, faced with little in the way of fungoid disease with the exception of an occasional outbreak of Oidium. Consequently we are apt to forget the danger which may arise when a cycle of favorable seasons comes round to promote the development of these lowly organised forms of plant life which we know as fungi. This is the case in the present visitation, for it is so many years since Anthracnose has been seriously prevalent that the younger generation of vinegrowers are quite unfamiliar with it, and the older ones have almost forgotten the outbreak in 1894-5. This will, in a measure, account for the many popular fallacies respecting the nature and origin of the disease which are prevalent, and of these the following may be taken as typical.

One man recently said to me, "Some say that this disease is a fungus, but I know that it is not. It comes from the roots." Another claimed that it came from the sap. Again it has been stated to be on thistles and other plants. Eminent pathologists have spent years in the determination of the life history and origin of Black Spot, establishing beyond a doubt that it is caused by a fungus now known to science as *Manginia ampelina* (V. and P.). It was in the past known as *Sphaceloma ampelinum,* and also as *Gloeosporum ampelophagum,* but the first is now the one generally accepted.

The man who from practical observation claimed that the trouble arose from the sap, etc., failing technical knowledge, had some justification for his assumption. He had noticed, probably, that it was often the most luxurious vines growing in the dampest spots which were worst affected, and immediately put it down to excess of sap causing a derangement of the organic functions somewhat akin to a bilious attack in the human being. What he did not understand was that these special conditions are contributing factors in the development of the disease.

That a thistle or other plant is covered with black spots does not establish it as being of the same origin as the spots upon the vine induced by Anthracnose. The natural laws governing the development of fungi affecting plant life show that they are, in most cases, limited to the selection of one host plant, and failing the presence of this particular one, they are not able to affect plants of a different nature. The power possessed by plants which enables them to resist fungi of an alien nature, has been termed "chemotropism," a phenomenon which prevents the indiscriminate attack of one fungoid disease upon a variety of plants.

Like all fungoid pests, Black Spot is controlled by climatic conditions, and as soon as these conditions become unsuitable, the trouble will automatically abate. Notwithstanding this, there is bound to be evidence of the disease for some years owing to the widespread nature of the infection at the present time. To rely upon the natural eradication by climatic factors would be unwise, as I shall attempt to demonstrate later on.

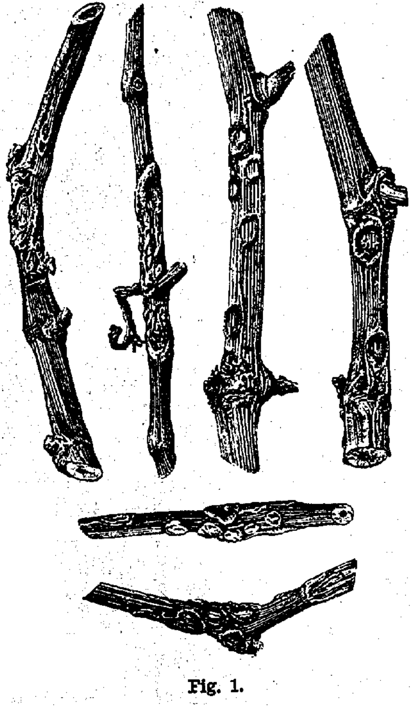

Fig. 1.

Anthracnose scars on ripened wood on the vine in winter.
After Viala and Pacottet.

Life History.

Anthracnose of the vine has been known for ages in Europe, and in this respect it differs from Oidium and Downy Mildew, which were introduced there from America some three-quarters of a century ago. It is one of the Endophytic or internal types of fungi, and from the time that infection takes place upon the young tender portions of the vine, all its growth is intermingled with the cellular structure of the host, and we cannot therefore destroy it without at the same time destroying the affected portions of the plant. Thus it is that all ordinary remedial treatments as applied to other types of fungi fail in the case of Black Spot.

Infection takes place by spores, and in studying the causes of infection we find that the disease manifests itself for purpose of reproduction in a variety of forms. We are indebted to the work of Viala and Pacottet for an explanation of its complicated life history, which, according to these scientists, is far more complex than was originally supposed.

The first evidence of the disease is apparent upon the tender young wood of the canes by a small discolored spot. This spot increases in size, becomes depressed towards the centre, and in the course of time may become a deep open wound. The whole growth of the vine may become distorted and black from the destroyed tissues. Where a number of scars form close together, the structure of the cane is so weakened that it very readily breaks off.

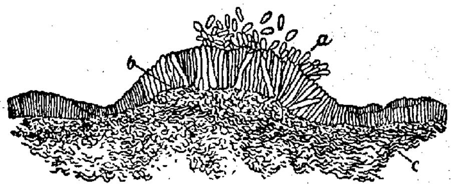

Fig. 2.

Diagrammatic section of a scar in early summer, showing how spores *a*, are produced on the closely-packed, erect filaments *b*, thrown up from the more or less decomposed tissues *c*, containing the mycelium of the fungus, though the latter is not easy to distinguish. (× 450). After G. Foex.

The spores give the pinkish color to the centre of the scar; they are produced in enormous numbers, and spread the disease if weather conditions permit of their germination.

In early summer the reproduction processes commence, spores forming in the wounds in great numbers, and being given off by closely-packed spore-bearing columns. These spores are said to be joined together in masses by a gummy substance, and on this account free water is needed to liberate them, and to bring about germination. Thus we find that it is only in seasons characterised by frequent rains that the disease is able to spread to a serious extent. The summer spores are washed from the scars and are distributed over the foliage where fresh centres of infection are started. Attacks are not confined to the wood, for leaves and young bunches suffer also, and although the effect upon the leaves may be secondary, that upon the young fruit bunches is disastrous. The whole bunch may perish before the fruit has set, or should infection take place at a later period, the fruit is severely injured. It is susceptible right up to the time of coloring.

As the wood and leaves become more fibrous, losing their soft turgid condition, infection by fresh spores becomes impossible. For this reason we find the fruit suffering in late attacks while the amount of disease apparent upon the foliage may be negligible. This condition is very much in evidence upon the Murray at the present time. Vines which from a casual glance would be considered clean, have, in many cases, the fruit more or less badly affected. The berries show black, depressed, more or less circular markings, either single or with two or more converging into an irregular patch.

As it appeared to me in the second week of December, there was every indication that the hotter weather had checked development for the time being, and if such were the case, no very serious amount of damage would have been done on the South Australian side. Heavy rain fell on December 11th throughout the settlements, and it is possible that there might be a further development as a result. Fortunately it was followed by cool southerly winds which dried the foliage quickly. Mildura is reported to be very badly affected, the whole crop of sultanas having been destroyed in some cases and the vines appearing as though a fire had passed over them.

The progress of the disease is in accordance with climatic conditions prevailing, and in 1916-17 the general experience indicated that from about mid-December its development was stayed. Badly affected vines began to make young growth which remained free from the disease. Following the active period of sporulation in the summer, when conditions prevent further progress, a fresh stage is reached in which the fungus prepares for the continuity of its life throughout the winter. The general plan common to fungi is to produce resting spores or perithecia, capable of resisting cold and moisture, and which return to active development with the advent of warmth in the succeeding spring.

In the case of Black Spot, the observations of Viala and Pacottet, after an exhaustive series of tests extending over a number of years, go to prove that its methods of perpetuation are far more complex. Not only does it produce perithecia within the wounds, but it also develops other such bodies as pycnidia, sclerotia, and a conglomeration of small bodies associated with the sclerotia to which they have given the name of kystes. The resting spores are distributed over the vine, and are also retained within the wounds caused by the fungus.

A sclerotium is a mass of reserve material developed from the mycelium, and which retains its vitality throughout the winter. In the early spring this mass is capable of developing spore-bearing columns, even when temperatures are comparatively cold. It is in effect, a perennial form of the fungus, and largely accounts for the early appearance of an outbreak in the spring. The spores liberated from this body rapidly attack any young growing tissues, and from this point the life cycle is started all over again. The discovery of this means of perpetuation is important as shedding additional light upon the reasons for the difficulty experienced in the eradication of the pest. Were it only a matter of dealing with the perithecia, the problem would be very much simpler.

Although fresh infection of old wood is impossible, the old scars harbor the bodies of reproduction, and remain in an active state of development for several years unless the remedial treatment destroys them.

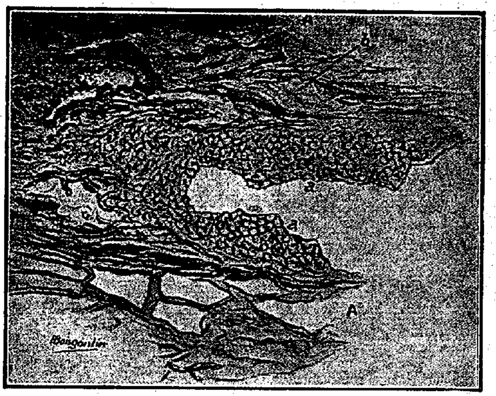

Fig. 3.

Section of a scar in winter (× 200), showing a sclerotium *a*, *a*, lining the greater part of a fissure cavity—it is now dormant; *b*, mycelium of fungus; *A*, *A*, streaky markings in the damaged tissues. After Viala and Pacottet.

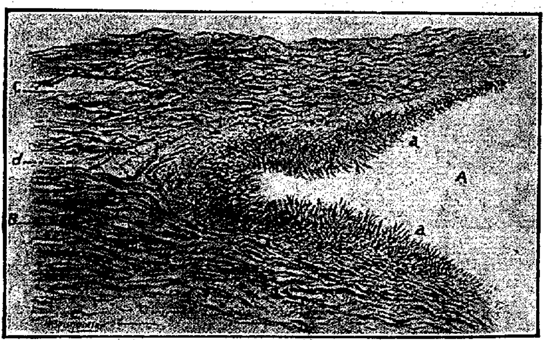

Fig. 4.

Section made in spring of a similar fissure to that in Fig. 3 (× 200), showing germination of the sclerotium; this throws out from its whole surface an immense number of conidiophores or filaments which bear summer spores or conidia *a*, *a*. After Viala and Pacottet.

METHOD OF SPREADING.

Water, as rain or dew, is absolutely essential to the germination of the spores, and it is for this reason that the disease has manifested itself in so many localities during the past two seasons which have been characterised by frequent showery conditions in the spring and early summer.

It will be generally noted that its spread is progressive around definite centres of infection, and may be confined to isolated patches, which gradually extend. In this manner it differs radically from Oidium and Downy Mildew, where infection of one or two vines is sufficient to spread either of them over large areas or districts in a short space of time. With the latter two diseases the wind carries clouds of spores over long distances. Black Spot does not do this: spread taking place by contact, by means of water as the vehicle of transportation, or by other mechanical means.

Low-lying land is particularly susceptible, especially if the soil is continuously damp. The point is raised frequently that the disease is in its worst form upon the higher ground, such as the side of a hill. This was very evident in many cases which I personally observed. Yet, if we get down to bedrock and seek an explanation of this fact, it is usually found that in such a low-lying heavy portion of a vineyard where one would naturally expect to find black spot, the drainage is exceptionally good, and the heavy nature of the soil allows the surface to dry out more rapidly. A higher portion of land may be more exposed, but it may have a defective drainage or irrigation water may be used to excess. Then, especially if the land is sandy, the humidity of the atmosphere within this local spot may be far higher than in the low-lying one referred to previously. Sandy soils retain their moisture more evenly and for a longer period than do the heavier soils, which dry and crack upon the surface. When these damp humid conditions prevail they prolong the conditions most likely to promote a lengthy development of the disease.

Another point favoring the development of Anthracnose is that the spores are capable of germination at a low temperature. It is thus able to secure a good hold, while there is yet considerable moisture in both air and soil, and before the normal heat of the day is great enough to bring about rapid evaporation. Having thoroughly established itself in 1916-17, the centres of infection were teeming with bodies needful to carry on the disease, and as conditions have again this year proved conducive to its development, it follows that attacks must be of a far more virulent nature.

The widespread nature of outbreaks, extending all through South Australia and Victoria, not only in the wine-growing areas, but upon the river settlements, indicates that the necessary means of starting the disease have probably been lying almost dormant since the last bad visitation in 1894-5, and simply waiting for climatic conditions to again favor a rapid growth of the spores. Possibly there has been a little development within favored spots for a number of years, but not sufficient to become very noticeable.

In the older-settled areas Black Spot was very much more in evidence than in the newer districts, but wherever there was infection in 1916-17 and no special care was taken for its eradication its progress has been much more marked in the present season. In all the worst centres of infection the disease was present last season, though confined to a few vines, but it has now spread over large areas, affecting whole vineyards.

As already stated, Mildura is very bad, Renmark is fairly generally affected, Berri has several fairly bad areas, and Waikerie has it slightly. The greatest danger lies in the probability of a very bad outbreak next year wherever it is noticeable at the present time.

TREATMENT.

As already stated, all the generally accepted theories for the eradication of fungi fail in the case of Anthracnose. That is to say that where we treat most fungoid diseases with copper salts in well-known spray mixtures or with finely-ground sulphur, Black Spot demands a far more drastic treatment before it succumbs. Summer treatment fails by reason of the internal nature of the mycelium. Therefore any attempt towards the eradication of the disease must be preventive rather than curative. Further, all treatment is rendered more difficult owing to the complex nature of the fungus. Remedies to be effective must be of such a nature as to corrode or burn, not only the spores with which they come in contact, but the tissues enclosing sclerotia and other of the *bodies* likely to perpetuate the disease.

In the early days of the disease in Europe both copper sulphate and sulphate of iron were tried, but with small success. Sulphate of copper was found to be quite useless, but the sulphate of iron had a beneficial action, more particularly if fresh and applied in concentrated solution by reason of its containing a small percentage of free sulphuric acid. From this fact arose the practice of swabbing with a mixture of sulphuric acid and iron sulphate, and to-day this is the standard treatment wherever Black Spot is known.

The original mixture recommended by Viala consisted of 10galls. of water to which was added 50lbs. sulphate of iron and half a gallon of strong sulphuric acid. The trouble of this was that being in such a concentrated solution it was necessary to apply hot, otherwise crystallisation took place on cooling. About this time it was also demonstrated that a plain 10 per cent. solution of sulphuric acid gave equally good results so far as the destruction of the fungus was concerned, but the effect upon the wood of the vines was very severe when winds led to concentration of the solution, causing splitting and cracking.

The mixture now recommended by Viala and Pacottet is made with 35lbs. sulphate of iron, 3lbs. to 5lbs. of sulphuric acid, and 10galls. of water. These solutions are of such a corrosive nature that the only practical means of application is with a swab free from metal bindings or with a brush made of hair and free from metal. A lead-lined knapsack spray pump has been devised to resist the acid, but is not obtainable locally.

From consideration of the nature of the disease it will be understood that very thorough and careful swabbing is necessary. Scars upon the old wood must receive first attention, but in view of the fact that old scars may go on developing spores and also by reason of the various hibernating bodies dispersed about the stem and arms of the vine, every part should have thorough attention. Old scars are difficult to treat, and it is possible to pass the swab or brush over them without wetting the interior, as the air in the cavity acts as a cushion to form a bubble.

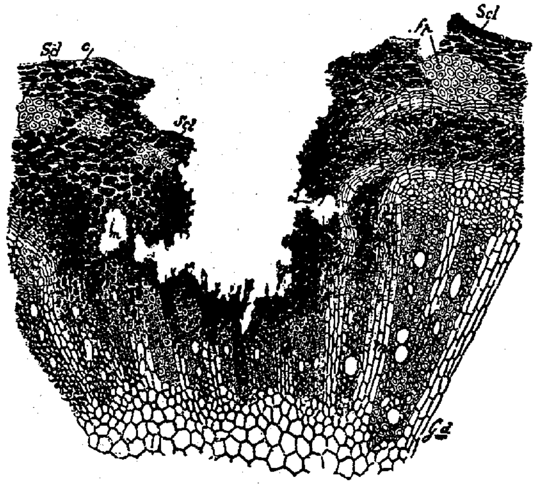

Fig. 5.

Magnified cross section through a deep scar, penetrating nearly to the pith, on a ripened cane. *Scl*, sclerotia. *Fp*, fibre bundles of bark. The blacker portions are tissues disorganized by the fungus; they contain closed cavities, *m*, in which sclerotia are also found.

From the irregular nature of the interior of the scar the need for very thorough swabbing, to reach all exposed sclerotia, will be realized. After Gouirand and Bergeron.

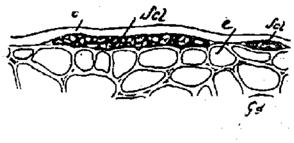

Fig. 6.

Diagram showing a small sclerotium of *Manginia ampelina, scl,* still covered by cuticle of vine *c,* cellular tissue of epidermis (bark) *e,* highly magnified. After Gouirand and Bergeron.

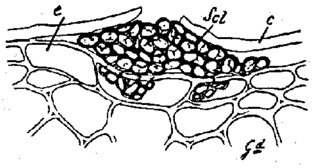

Fig. 7.

A rather large sclerotium, becoming exposed by the breaking of the cuticle. After Gouirand and Bergeron.

The time to swab is as important as the swab mixture itself. It would appear that the stage when the disease is most vulnerable is just before the buds burst in the spring. The operation must not be left too late, for the solutions will injure the buds, which may be swelling.

It is sometimes difficult to accurately gauge the time owing to variations in seasons, but if we take it as a general rule that the buds will burst under our climate during the early part of September, the time for swabbing can be fairly well adjusted. The perithecia are beginning to soften under influence of warmth and moisture from about the end of July, and the sclerotia also are making ready to break into active life. It must be remembered that one cannot get perfect results with one treatment, and therefore it will be wiser to give two. The first may be given, say during the last week in July, and a second one some two weeks later. One tendency of the swabbing is to make the buds burst later than they would normally do.

Too much attention cannot be given to incipient outbreaks when confined to but a few vines, because the means of more rapid progression will be destroyed. The action of the corrosive solution is to destroy the resting spores conidia and kystes, and also to burn or corrode the surface layers of sclerotia forming a horny tissue through which the underlying organisms cannot break.

Some difficulty may be experienced in wetting the rods thoroughly if they are tied down, but this can be overcome by treating before tying. They can then be handled more easily while being swabbed. As subsidiary treatments the following will be found to be of great assistance in the eradication of Black Spot:—All prunings from affected vines should be burned on the spot and with as little handling as possible. Removal of old bark will facilitate swabbing of the stem, but it entails a great amount of labor, and therefore it may not be possible. In any case all portions of the bark, if it is removed, should be burned at once.

Although summer treatment is out of the question from a curative point of view, yet such may be used as supplementary to the main or swab treatment. Whereas salts of copper are useless in the dormant period, they may play an important part later on in preventing the germination of summer spores upon the young growth. If the foliage is coated with Bordeaux or Burgundy mixture, the tender penetrating mycelium of the spore will be destroyed as it seeks to enter the superficial tissues.

Following on the double swab, the vines should be given a spraying with either of the sprays mentioned as soon as the buds have burst, and a second one when the shoots are 4in. to 6in. long. From this point the grower should be guided by local climatic conditions at the time. With a dry, warm spring and early summer there will probably be a little evidence of the disease following these measures. If damp conditions continue, then a third spraying may be necessary, giving special attention to the fruit. It must be understood that half measures are no good. Black Spot is here and it has to be dealt with in a vigorous manner. There is no room for doubt as to the effective nature of the remedies if they are of standard strength and are properly applied.

EXTRA TREATMENT OF BADLY-AFFECTED VINES.

Where the disease is in an advanced stage, the vine presents a sorry appearance, being devoid of fruit, and almost defoliated. Much good can be done by destroying all affected portions now and endeavoring to obtain a limited number of clean canes to prune to next season. Old rods with their diseased growths may be cut back on to their base buds after the disease appears to have been checked by the advance of dry, warm weather. These prunings must immediately be burned, thereby destroying incredible numbers of the organs of reproduction. By the time the leaves fall there should be some fair growth upon the vines, and even if not very long, it is preferable to scarred wood.

VARIETIES MOST AFFECTED.

Sultana is the most susceptible of all varieties, and is closely followed by Waltham Cross. The Muscatels take the disease fairly badly, as do also the Malagas, Doradillo, and Ohanez. The Zante currant is not as a rule badly affected, though I saw several patches recently which had it to a mild degree. Amongst the wine varieties, Carbernet, Malbeck, Riesling, Carignane, and Sweet Water are the most likely to be affected. Shiraz and Mataro appear to be almost immune.

To growers of Sultanas the most serious aspect of the trouble is presented as instanced by its ravages in the Murray settlements, and although we may expect a return to dry conditions of climate in the near future, it would be unwise to rely upon this for the eradication of Anthracnose. To neglect to use every available means of treatment next winter and spring is to court disaster.

FARM BUTTER-MAKING IN SUMMER.

It is by no means an unusual thing during summer to experience considerable difficulty in making butter on the farm. The trouble, of course, is the temperature. In writing a correspondent who had had trouble in this way, the Dairy Expert (Mr. P. H. Suter) advised the purchase of a small dairy thermometer, at a cost of from 1s. to 1s. 6d. He explained that the high temperature of the cream prevented the separation of the butter milk from the butter fat. In order to reduce the temperature of the cream, it could be lowered down the well, brought to the surface and thoroughly stirred after the expiration of three hours, and replaced immediately. This could be repeated two or three times. Churning should be done in the open, either early in the morning, or in the cool of the evening. Another expedient was to sew a piece of canvas, double thickness, around the cream can, keep it wet, and standing in a cool, draughty place. The cream should be stirred occasionally, and churned in the cool of the morning.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, December 12th, there being present Messrs. George Jeffrey (Chairman), W. J. Colebatch, T. H. Williams, G. R. Laffer, M.P., A. M. Dawkins, C. J. Tuckwell, A. W. Shillabeer, F. Coleman, and H. J. Finnis (Acting Secretary). Apologies were received for the absence of Professor Perkins and Mr. J. Miller.

SHEEP-DIPPING.

The Kanmantoo Branch of the Agricultural Bureau wrote suggesting that the Murray district should be brought under the scope of the Act providing for the compulsory dipping of sheep. It was mentioned that the Board had already recommended the extension of the operations of this Act to embrace the whole of the district council areas of the State.

The Kybybolite Branch suggested that the Board should take steps to have analyses of various sheep dips on the market published. Mr. Williams (Chief Inspector of Stock) explained that at his request samples of dips had been supplied for analysis by the agents. Of those examined, only two had come up to the required standard. On the motion of Mr. Laffer, it was decided that the Minister of Agriculture should be informed that the Board was of the opinion that steps should be taken to give effect to the suggestion of the Kybybolite Branch, and it was recommended that sheep dips should be placed on the same basis as fruit sprays and fertilizers.

HELPING RETURNED SOLDIERS.

The Naracoorte Branch suggested that each Branch of the Bureau should report on the suitableness and value of any land proposed to be acquired in their respective districts for the settlement of returned soldiers, and mentioned that it was prepared to give every assistance to returned soldiers who might settle in the neighborhood of Naracoorte. The Board resolved to send the communication to the State War Council.

PRIZES FOR ESSAYS.

A letter from the Secretary of the Orroroo Branch suggested "for consideration by the Board," that a prize or medal should be offered annually in each of seven districts of the State for the best paper sent in for competition, the members of the Board to act as judges. Mr. Colebatch thought it would be better to select a number of subjects and make them open to the whole State. After further discussion it was left to Professor Perkins (Director of Agriculture) and Mr. Colebatch to draft a scheme.

RABBIT DESTRUCTION.

The Goode Branch inquired whether, in view of the impossibility of securing wire netting at present, the Government would supply poison carts to the Branches for the poisoning of rabbits. Stress was laid on the damage which was being done by the rodents. The Acting Secretary explained that he had written to the Branch suggesting the co-operative purchase of a cart. It was decided that the Branch should be informed that the Board could not recommend the adoption of their request that a poison cart should be supplied. If the Branch desired that the matter should be brought under the notice of the Government, it was suggested that the Branch communicate with the Parliamentary representatives for their district.

AUSTRALIAN-MADE CORNSACKS.

In the early part of the year the attention of the Board was directed to the fact that whilst imported cornsacks had to conform to a definite standard of both size and quality, under the provisions of the Commerce Act, there was apparently no regulation governing the size or quality of cornsacks manufactured within Australia. The Board recommended that legislation should be introduced to ensure that locally-made cornsacks should be made equal in size and quality to those imported. Representations were made to the Commonwealth Government. who had replied to the effect that apart from any action which might be possible under the War Precautions Act, that Government had no power to fix a standard for cornsacks manufactured and used in an Australian State. In response to a further communication of the Board, the Premier of the State Government had intimated that the matter would be brought before the Premier of New South Wales, with a view to securing joint action by the States.

BACON-CURING.

A communication from residents of Carpa sought particulars regarding the probable plant required for the starting of a co-operative bacon factory capable of dealing with 100 pigs a week, the cost, and the amount of financial assistance which might be expected from the Government. On the motion of Mr. Laffer, it was agreed to refer the matter to the Director of Agriculture, and to send to the people of Carpa a copy of the Loans to Producers Act.

LIFE MEMBERSHIP.

The name of Mr. J. Piggott, who had been a member of the Clarendon Branch since February 21st, 1896, was added to the list of life members of the Agricultural Bureau.

NEW BRANCHES.

The Board approved of the formation of a Branch at Meribah, with the following gentlemen as foundation members:—Messrs. W. T. Young, A. H. Symonds, H. Newman, J. S. Crouch, D. G. Kirkbright, R. Kirkbright, A. Gray, A. G. Petch, W. J. Parker, H. Ortloff, M. T. Hank, F. B. Wedding, H. G. Wedding, W. F. Paull, H. T. Dart, E. Mundy, A. Bishop, W. E. Jones, E. Jones, H. A. Nitchske, F. W. Handorf, M. V. Merkel, H. J. Daily. F. Tee.

Approval was also given for the formation of a Branch at Ashbourne, with members as follows:—Messrs. T. Kirkham, H. Meyer, V. Payne, A. Carter, W. Forrest, J. Meyer, R. Weir, W. Clarke, W. Allingham, V. Cox, A. Cox, and J. H. Potter.

NEW MEMBERS.

The undermentioned names were added to the list of members of existing Branches:—Naracoorte—E. J. Flaherty, J. McMorron, B. J. Magarey, Fred. Schulz; Butler—H. W. B. Treasure; Moonta—E. Major, jun., A. Retallick; Goode—E. A. Watson, S. O. McPhursen, G. Watson, P. W. Hunt; Coonwarra—A. Redman, J. Hinton; Glencoe—J. Burston; Pompoota—J. P. V. Trout, W. Tiggamen, E. A. Turner, W. Duhne, A. Rowlands; Koppio—E. W. Price; Brentwood—F. L. Carmichael, H. C. Lehmann; Clare—J. Matthews, Stan. Maynard; Parrakie— — Warren; Myponga—A. Rowley, T. Forrest, W. J. S. Baxter, Alf. Rowley; Clarendon—J. L. Giles; Milang—E. A. Dixon; Meadows—F. Wright, jun.; Tatiara—A. E. Milne; Salt Creek—W. Pulford; Mount Barker—E. Jacobs, — Atkins, G. L. Rankine, S. Childs, A. Sutherlands; Cygnet River—A. G. Boxer; Coonalpyn—W. H. A. McCracken; Naracoorte—G. Ludwig, O. Poole, S. Hart; Yeelanna—H. Loller, H. Glover; Whyte-Yarcowie—E. Fowler; Yacka—P. J. Harvey; Kingston-on-Murray—W. P. Cranner.

STATE OF SOUTH AUSTRALIA.

REPORT ON THE STATISTICS OF VINEYARDS, ORCHARDS, AND GARDENS, FOR THE SEASON 1916-17.

[By W. L. JOHNSTON, Government Statist.]

VINEYARDS.

The climate of this State is eminently suitable for vine-growing. The vineyards are distributed chiefly throughout the Central and Lower North Divisions and in county Robe in the South-Eastern Division. The grapes are grown for the table, drying, and wine-making. All figures in parentheses throughout the report are those for the previous year.

Acreage.—29,177 (27,764) acres are under cultivation; of this area 24,376 (23,778) acres are planted with vines of bearing age and 4,801 (3,986) acres with vines not yet of bearing age. The acreage is divided as follows:—For table purposes, 1,084 (1,050) acres; for drying, 7,637 (8,498) acres; for wine-making, 20,456 (18,216) acres. The area has increased 5,191 acres during the last five years.

Grape Yield.—The yield of grapes this season was 35,074 (46,427) tons or 1.44 (1.95) tons per acre of bearing age. This yield was approximately disposed of as follows:—15,360 (21,240) tons for drying;

758 (1,608) tons for table purposes and export; and 18,956 (23,579) tons for wine-making. Owing to the high price offering for grapes for distillation purposes, large quantities of drying grapes were sent fresh to the distilleries. As in the case of fruit trees, vines are grown to a very large extent in gardens of less than one acre attached to private residences, the produce being consumed privately. The tonnage thus grown must be fairly large; but as it is not possible to arrive at a reliable estimate of the quantity, it is excluded from the production shown.

Currants.—50,147 (66,518) cwts. were dried, being a decrease of 16,371cwts. on the record crop of the previous season, but an increase of 9,124cwts. on the average of the last 10 seasons. During the year 14,778cwts. of currants, value at £42,846, were exported to oversea countries.

Raisins.—Sultanas 23,662 (32,119) cwts., decrease 8,457cwts. All other 11,962 (27,810) cwts., decrease 15,848cwts. The total, 35,624cwts., was 489cwts. more than the average of the last 10 seasons. Raisins to the value of £39,480 were exported oversea, chiefly to the United Kingdom.

Wine Made.—2,951,048 (3,709,878) galls. of wine have been made this season, being a decrease of 758,830galls., but an increase of 45,217galls. on the average production (2,905,831galls.) of the last 10 seasons. Of the quantity made, it is estimated that 1,046,891galls. will be distilled. A reference to the results of the last 10 vintages shows that approximately one-half of the total wine made has been used for distillation purposes.

Wine Exports.—The exports oversea show a falling off in quantity 335,000 (380,719) galls., and an increase in value £40,591 (£38,987). Five years ago the totals were 461,414galls., value £53,763. A large interstate business is also done, of which there is no record.

Wine Stocks.—The stocks reported to be in hand at the close of the recent vintage show a decrease of 141,322galls., the total being 4,447,285 against 4,588,607galls. at the same period last year.

ORCHARDS AND GARDENS.

Acreage.—The area under fruit culture has been steadily increasing during the last five years. The latest returns show that 28,794 (27,576) acres are devoted to this purpose. Of this acreage the trees which have reached bearing age account for 20,809 acres; and the trees which have not yet reached bearing age 7,985 acres.

The localities suitable for fruit-growing are numerous and extensive, thus affording ample scope for profitable expansion.

The distribution of the cultivated area is mainly in counties Adelaide, Hindmarsh, Light, Stanley, Victoria, Grey, Robe, Frome, and the counties bordering the River Murray, notably Hamley (where the Renmark Settlement is situated) and Albert.

Exports Oversea.—Inclusive of raisins and currants £100,679 value of dried fruits was exported during the year—United Kingdom £90,202; South African Union, £10,472; and India, £5.

Production.—In addition to the fruits mentioned below, considerable quantities of figs, quinces, raspberries, strawberries, and other berry and bush fruits are produced, also almonds, walnuts, and olives.

Kinds.	Seasons and Quantities of Fruit Produced.					
	1912-13.	1913-14.	1914-15.	1915-16.	1916-17.	Average Ten Seasons.
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Apricots	116,366	144,962	73,653	159,077	154,879	129,123
Apples	448,468	450,240	224,257	832,872	169,061	460,890
Pears	91,533	86,852	63,656	118,268	121,438	83,226
Cherries	28,313	53,270	35,885	21,550	21,119	42,417
Plums	83,053	93,173	46,362	114,014	105,094	90,751
Oranges	137,031	139,952	129,820	73,455	101,186	146,281
Lemons	31,515	28,936	22,816	17,859	24,669	34,357
Peaches	72,509	92,146	74,994	79,395	153,399	79,595

Peaches.—153,399bush. This easily surpassed the previous record of 92,146bush. in 1913-14.

Pears, with a yield of 121,438bush., established a record, the previous best yield being 118,268bush. in 1915-16.

Plums.—105,094bush., which was only 8,920 bush. below the record crop of the previous year.

Dried Fruits.—The quantity of the different kinds of fruit dried for each of the last five seasons is as follows:—

(For Currants and Raisins see Vineyards.)

Seasons.	Quantities of Different Kinds of Fruits Dried.				
	Apricots	Apples.	Pears.	Peaches.	Plums and Prunes.
	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
1912-13	3,908	1,208	550	1,180	592
1913-14	5,696	1,164	462	2,466	1,931
1914-15	2,573	137	800	1,519	861
1915-16	3,939	2,362	731	1,844	2,106
1916-17	5,421	265	2,106	4,491	1,516
Average ten seasons	4,690	1,185	661	1,691	1,280

Value of Production.—The estimated value of the products of the orchards and gardens for each of the last five seasons, the percentage of such value to the total value of all crops, and the average value per acre of trees of bearing age, is as follows—

Seasons.	Value of Orchard and Garden Production.		
	Total for State.	Percentage to Value of all Crops.	Value Yield per Acre of Trees of Bearing Age.
	£	£ s. d.	£ s. d.
1912-13	391,433	4 19 0	23 3 11
1913-14	384,478	6 3 10	22 4 1
1914-15	287,801	7 0 4	15 18 11
1915-16	359,491	2 17 11	18 12 1
1916-17	283,614	2 4 2	13 12 7
Average ten seasons	341,363	4 2 9	19 9 5

The foregoing statements of acreage, production, and values do not represent the total results; for large quantities of fruit are grown in numerous gardens of less than one acre attached to private residences in suburban localities, most of which is privately consumed. It is not possible to arrive at any reliable estimate of the quantity and value of fruit thus grown.

MARKET GARDENS.

The area so cultivated is chiefly located in the hills surrounding the city of Adelaide, the total area outside of county Adelaide being only about 4 per cent of the whole. The area for 1916-17 is given as 1,522 (1,712) acres, and the estimated value of the products raised was £66,234 (£79,557), or £43 10s. 4d. (£46 9s. 5d.) per acre. These details exclude areas of one acre and over, specially utilised for growing pumpkins, melons, and tomatoes. For the season 1916-17 it was estimated that 345 (203 acres were under pumpkins and melons, and 287 (319) acres under tomatoes, the value of the production being estimated to be respectively £8,449 (£7,515) and £12,087 (£30,631).

ROOT CROPS.

Under this heading are classified all root crops covering one acre or more, the chief being potatoes and onions. The total acreage was 5,299 (4,996), an increase of 303 acres; 4,737 (4,341) acres of potatoes produced 20,343 (12,991) tons, or 4.29 (2.99) tons per acre; and 288 (376) acres of onions produced 2,252 (2,297) tons, or 7.82 (6.11) tons per acre. In addition to these crops 998 (1,490) tons of mangolds, 587 (429) tons of turnips, 169 (160) tons of carrots, and 285 (300) tons unspecified were produced. The cultivated area is almost entirely limited to counties Adelaide and Hindmarsh in the Central Division, and county Grey in the South-Eastern Division; but the area of suitable land in the State will permit of considerable expansion in the growth of all root crops. The estimated value of production was £111,304 (£122,463) or £21 0s. 2d. (£24 10s. 3d.) per acre. There were also 192 (214) tons of chicory produced in county Grey.

THE AGRICULTURAL BUREAU.

TOUR OF SOUTH-EASTERN BRANCHES.

A strong body of officers of the Department of Agriculture recently spent a week in an organised tour of some of the South-Eastern Branches of the Bureau. The party consisted of the Horticultural Instructor (Mr. Geo. Quinn), the Wool Instructor (Mr. Henshaw Jackson), Poultry Expert (Mr. D. F. Laurie), Superintendent of Experiments (Mr. W. J. Spafford), Dairy Expert (Mr. P. H. Suter), Orchard Inspector in the South-East (Mr. R. Fowler), Inspector of Experimental Plots (Mr. A. S. Alcock), and the Acting Secretary of the Advisory Board (Mr. H. J. Finnis). The general idea of the tour was for the officers of the Department, in company with members of the Bureau, to visit individual farms, butter and cheese factories during the day, and in the evening for short lectures to be delivered by the officers. Practical demonstrations were also given as opportunity offered.

The first place visited was Coonawarra, at which centre, after inspecting various orchard blocks, the party gathered in the wine cellars for the purpose of hearing the Horticultural Instructor explain the proposed arrangement for the co-operative marketing of fruit. After lunch, at which the party were the guests of the Coonawarra Branch, visits were paid to the farms of Messrs. J. Davidson, P. H. Kilsby, and H. Ricketts. In the last-named gentleman's woolshed, where shearing was in operation, the Wool Instructor demonstrated the method of classing wool clips. In the evening a large attendance at the Penola Institute listened to an address by the Poultry Expert, after which a number of questions, submitted by the audience, were replied to by the officers.

The party then left for Millicent, and devoted the day to the inspection of various holdings. In the morning the farms of Messrs. J. B. Mitchell, J. Bell, and G. Bird were inspected, and after lunch a visit was paid to Mr. H. L. Holzgrefe's farm. The Murrimbum Cheese and Butter Factory was then inspected, and subsequently Mr. M. Hart's orchard. Thursday was spent at Glencoe. Mr. G. F. Fergusson's was the first place visited. Here members were provided with morning tea. A move was then made to the experimental plots on the farm, where Messrs. Spafford and Alcock explained the objects underlying the tests that are being conducted there. The party was then conveyed to Mr. A. E. Hutchesson's farm, where shearing was in full swing. The Wool Instructor (Mr. Henshaw Jackson) took the opportunity of giving the farmers a practical demonstration of wool-classing. Mr. P. S. Mitchell's homestead was next visited, where the chief item of interest was a particularly fine crop of Zealand Blue wheat which is expected to average 50bush. to the acre. At Mr. G. Copping's farm the visitors were shown a fine flock of Crossbred sheep and some good draught stock. Calling next at Mr. J. Riddoch's they inspected that gentleman's dairy herd and milking plant, and a good crop of lucerne was noticed on the farm. Lunch was partaken of at the district hall. Mr. J. T. Halliday presided, and several toasts were honored. After lunch Kirip was visited and the first stop made at Mr. J. T. Halliday's residence. A move was then made to Glencoe East, and the holdings of Messrs. Dow, Childs, and Robertson were inspected. The Glencoe East Cheese and Butter Factory was the next point of call. Mr. P. H. Suter spoke in very high terms of the manner in which the factory was conducted. The final places called at were the farms of Messrs. Gratwick, Fraser, H. J. Bodey, and Nichol. On Thursday night lectures were delivered by Messrs. Suter and Jackson at Glencoe, and by Mr. Spafford at Mount Gambier.

On Friday, in company with the members of the Mount Gambier Branch, a tour of the district was made. The first place of call was Mr. Pritchard's dairy farm, where morning tea was served by Mrs. Pritchard. From this holding a move was made to the Yahl Butter and Bacon Factory, from which place the party adjourned to the experimental plots being carried out by the Department on the farm of Mr. H. Kilsby. In the afternoon a meeting was held in the Moorak Co-operative Butter Factory, where the Dairy Expert (Mr. P. H. Suter) addressed a large gathering. Subsequently tea was served in the factory. After a tour through a number of holdings on Moorak the party returned to Mount Gambier and subsequently entrained for Adelaide.

VEGETABLE SEEDS.

The following list of some common vegetables, showing approximately the number of years over which their seeds may be expected to retain their powers of germination satisfactorily (say, above 55 per cent.) has been supplied by the Botanical Assistant (Mr. H. W. Andrew):—

Seed.	Years.	Seed.	Years.
Bean	3	Onion	2
Beet	6	Parsnip	2
Cabbage	5	Parsley	3
Carrot	4	Pea (garden)	3
Cauliflower	5	Pea (field)	3
Celery	8	Pumpkin	4
Cress (common)	5	Radish	5
Cucumber	10	Rhubarb	3
Gourds	6	Spinach	5
Leek	3	Tomato	4
Lettuce	5	Turnip	5
Maize	4	Watermelon	6
Mustard	4		

FODDER CROPS ON RECLAIMED SWAMP LANDS.

[An Address delivered by the Superintendent of Experiments (Mr. W. J. Spafford) before the Mypolonga Branch of the Agricultural Bureau.]

At present fodder crops under irrigation on reclaimed swamp lands can almost be described for South Australia by the one word—lucerne. In order to realize that this limitation is wrong, it is only necessary to look at the older irrigation settlements of the world, and in most of them it will be found that lucerne is hardly grown at all; and, considering the fact that irrigationists in this country talk as if lucerne were the most wonderful fodder crop in the world, there must be some reason why it is not grown to the same extent in the older countries as it is here. Many advocates of lucerne go so far as to make the statement that this is due to the fact that the other people do not know the value of the crop; but this is quite an idle statement, because lucerne was known for centuries before Australia was heard of; in fact, was cultivated back in remote antiquity, and has been tried times without number at all irrigation settlements, only to be more or less discarded from the ordinary cropping. The reason for this appears to be because annual crops prove more profitable over a series of years than do perennial crops. This is only to be expected, for all perennial plants are dormant during a certain period of each year, and at that time produce practically nothing, or, at all events, but very little. Annual crops, on the other hand, only occupy the land for a very short space of time, and the rotation of these crops is so arranged that a crop is grown every season of each year. This growing of annual crops on the whole of an irrigation settlement is, of course, only possible where there is a large population, for it entails much hand labor; but that it should be kept in view is quite necessary, because the dropping of perennial crops and the replacing of them by annuals, has been the experience of all the older irrigation countries, and as population increases here it will be our experience also. Really our irrigation methods generally are based on American practice, and are likely to remain much as they are while we are reclaiming large areas of rich land, and while our population is small.

LUCERNE.

Situated as we are, with comparatively large areas and a very scanty population, we will naturally grow those crops that call for the least man-labor to produce a given amount of fodder, and at the head of the list of crops for this purpose, lucerne easily stands first.

The history of lucerne is closely related to the history of civilized man himself; it originated with him in Central Asia, and has followed him over the earth. It was the most important forage crop of the ancient Persians; but it was possibly domesticated by more ancient people than them. It was next introduced into Greece, and from here the Romans obtained it; and it then spread throughout the Mediterranean region, France, Spain, and Europe generally. Since then civilised man has taken it wherever new lands have been settled by him.

SEEDING.

With good seed to plant, the most important factor governing what the stand will be is the preparation of the seed bed, which means that the land must be so cultivated as to bring it to such a condition that the seed germinates freely and evenly, and the young plants grow readily without a check of any kind. The ideal seed bed for lucerne is soil ploughed up and then so worked that only the surface of the soil to the depth that the seed is planted is loose, the under layers being well compacted together. For spring sowing of seed this seed bed is obtained readily by ploughing in the autumn, and then keeping the surface soil worked right up till seeding time, being careful that all cultivations given are no deeper than is necessary to either kill weeds or break the surface crust, as the case may be. For autumn sowing the land should at least be ploughed in the summer, and compacted together by frequent heavy rollings, the surface being cultivated up after every rolling.

As mentioned above, the seed is sown either in the autumn or spring, and in most places in situations not subject to very severe frosts. Autumn seeding has the advantage on spring seeding in that it usually returns fair yields of fodder in the first season, whereas the latter rarely gives fully profitable returns until the second year. Also, unless the land to carry the lucerne crop has been bare fallowed for a year before being seeded, the spring-sown crop is dirtier with weeds than is the autumn sown during the first year; the weeds germinate in the autumn-sown crop, but the first cutting in the spring usually removes all the weeds, and the lucerne then comes away clean.

To get a really good stand of lucerne, about 20lbs. of seed per acre should be used, and if germination conditions are good at the time of seeding, this amount of seed put in with a seed drill fitted with attachments for sowing small seeds will give all that is desired. The seed should never be put in at a greater depth than 1in., and when conditions admit of it, even shallower than this is advantageous. Careful broadcasting, by hand or machine, distributes the seed evenly enough if the broadcasting is done by putting half the seed on one way and the other half at right angles to it; but, whatever method of covering the seed is used, the work must be done unevenly. This uneven covering leads to irregular germination of the seed, and, in fact, unless absolutely ideal conditions obtain at the time, many seeds do not germinate at all.

The question of a nurse crop for lucerne is often raised, but on the whole this is by no means necessary—indeed, about the only times when this is of much advantage is when laying down a lucerne plot with autumn seeding in a district liable to severe frosts, and in soils of a light sandy nature and so liable to drifting. For the purpose, half a bushel of rye to the acre does very well, or, for that matter, a light seeding of any of the cereals fills all requirements.

After-Seeding Treatment.

Autumn-sown lucerne needs no treatment until the spring, as the weed growth should be left throughout the winter to protect the young lucerne plants from frosts. As the weeds begin to run up to flower, the whole crop should be cut and removed from the plot, and from then on the plot will be cut in the ordinary way.

Spring-sown lucerne needs some care bestowed on it during its first year, for it must be cut often enough to prevent the weeds from choking it out, and at the same time it must not be cut so often that the roots are prevented from developing because of the want of leaf growth. In hot, dry years a spring-sown lucerne plot in which many weeds are growing can be spoilt by too close a cutting, thus exposing the young plants too suddenly to the fierce sunlight, after having been protected and shaded for so long by the weed growth.

Management in the Field.

A lucerne crop will not continue indefinitely producing maximum yields, and so one of the first things to discover for the proper management of the crop in any particular conditions is just how long each stand will profitably occupy its plot. The rapidity with which a crop of lucerne becomes too thin to produce maximum returns varies very considerably with the conditions under which it is grown; but that it is fairly rapid under some conditions the following figures from Kansas Experiment Station, and quoted by A. M. Ten Eyck, will serve to show:—

One plot of lucerne in the spring of 1903, about six months after seeding, had 11.33 plants to the square foot; in the spring of 1906 but 6.70 plants; and in the spring of 1907 it was down to 4.03 plants to the square foot. Another plot in the spring of 1904, soon after germination, had 45.2 plants to the square foot; in 1905 it was reduced to 16.1 plants; and in 1908 there were only six plants to the square foot. In both cases, even though the reduction in plants was so considerable, the produce from the plots had not been reduced, and on appearance were as good as ever. The number of plants, however, continue to get less and less, even after the struggle between plants and the smothering out of the weaker ones has finished, and seems to be mainly due to the fact that none of the lucerne plants are extraordinarily long lived, and some very much less so than others; for instance, some of the plants may live three years, others four years, others again five years, and so on, some of them even being comparatively long lived.

Thickening Up a Thin Stand.

If for any reason the germination of a plot of lucerne is irregular, it is certainly a good practice to reseed the thin patches. These patches should be very lightly cultivated up, preferably with harrows, seed broadcasted on them, and very lightly covered. This reseeding must be done while the plot is young, as it is common experience to have great difficulty in thickening up a stand of lucerne by reseeding once the crop is properly established and getting old. Once an old crop has become thin, and grows much grass and weeds, it should be ploughed up, and should carry at least a couple of crops different from lucerne before again attempting to get a stand of lucerne on the particular block of land.

CULTIVATION OF THE LUCERNE CROP.

It is common experience that just as it pays to cultivate other perennial crops, and most strong-growing plants, so does it pay to cultivate the lucerne crop. Cultivation is very important the first year after a plot has been seeded, for the use of a strong harrow in the spring breaks the surface crust, admitting much air, which is so necessary to the young roots, and a cultivation later in the season, say, after the fourth cut, will remove many of the weeds likely to interfere with the following year's crop.

Cultivation each spring, and, better still, after each cutting throughout the season, helps the lucerne crop, because:—

1. It loosens the soil, so admitting air and water more readily, and reduces the losses of water by evaporation. This work is particularly useful where lucerne is grazed, as livestock pack the surface very firmly together.
2. The roots of lucerne must breathe, and the useful soil bacteria living on the roots of these plants must have access to free nitrogen, so that anything tending to increase the supply of fresh air to the soil is of the utmost importance.
3. The organic matter, in the form of leaves and animal droppings, is more or less evenly spread and incorporated with the soil, instead of being left in heaps on the surface.
4. The crowns of the lucerne plants are split by the implements, and this is usually claimed to be an advantage, particularly on old stands, on the grounds that the split crowns produce more stems than they otherwise would.
5. Irrigated lucerne benefits considerably by surface cultivation for the above reasons, and also by breaking up and distributing any silt that is left on the surface.
6. The eggs and larvæ of insects that affect the lucerne plants are destroyed in large numbers by breaking them up and by exposing them to weather and birds.

USES OF LUCERNE.

An analysis of lucerne shows it to be a very rich food for animals, both in the green state and dried as hay, as the following figures by Kellner show:—

		Digestible Nutrients.					
	Water.	Crude Protein.	Crude Fat.	Crude Nitrogen-Free Extract.	Crude Fibre.	Starch Equivalent.	Nutritive Ratio.
	%	%	%	%	%		
Green lucerne	76.0	3.2	0.4	6.3	2.9	9.1	1 – 3.19
Lucerne hay	20.0	9.0	1.6	18.6	9.6	23.7	1 – 3.57

This crop, having such a very narrow nutritive ratio, shows that it is proportionately much richer in digestible proteins than is necessary, and so when fed to livestock without admixture of other foods with a much wider nutritive ratio, much of the most valuable of stock foods—digestible protein—is wasted.

The stems of this plant being comparatively fine, it offers no physical difficulties to any class of farm livestock, all being able to eat it in any stage of development. For the same reason, it can easily be made into hay without the finished article being in any way objectionable. The crop can be manufactured into and stored as ensilage, but as it is very rich in proteins, and the losses of proteins in the making of ensilage are high, it is on the whole much too valuable a crop to be stored in this way, unless it is the only forage crop grown, and stored succulent fodder is needed on the farm.

All the farm livestock do well on lucerne, either in the green state or as hay, but because of its high protein content it is an exceptionally good milk producer.

OTHER PERENNIAL FODDER CROPS.

For rich, well-drained soils, under irrigation, there are no perennial fodder crops that will compare with lucerne where the hand labor to be used is strictly limited; but there are a few worth consideration as crops likely to produce more than will lucerne under certain special conditions.

PASPALUM DILATATUM (Golden Crown Grass).

Paspalum dilatatum is a perennial grass grown fairly largely in parts of Australia, and is used as a pasture crop or is cut for hay, but is more suited to the former method of handling than the latter, because when cut and not regularly grazed the individual plants tend to make very large, coarse tussocks. Its advantage over lucerne for any particular conditions is that it will grow in wet, swampy places—just where lucerne-growing is hopeless—and if the soils are rich as well as wet, it produces a very large quantity of feed very suitable to large stock, especially dairy cows and cattle generally. Sheep and horses eat this grass fairly readily, and both kinds of livestock do well on it.

Plots of this grass are put down either by seed or by transplanting rooted sections of old plants. Transplanting must be done in the spring or early summer, as this is purely a summer-growing crop, and if put in too soon many of the plants will not take root as soon as planted, because of the weather being cold, and so die. Seed can be sown either in the autumn or the spring, but if to be sown in a wet location the autumn is the best time for seeding, as very possibly the land will be waterlogged in the early spring, so delaying the preparation of the soil; 7lbs. to 10lbs. of seed per acre are necessary, and, depending on the method of irrigation to be adopted for the crop, will either be sown in rows by a drill or broadcasted. As the seed is small, and needs a fair amount of warmth to germinate it, the soil must be worked to a very fine seed bed, and the seed must be sown very shallow.

Paspalum is often sown in mixture with other grasses, but as it quickly covers the whole surface of the land, little is to be gained by this procedure.

Where grown, constant care is necessary to see that it does not spread into other perennial crops, and into water channels, as it chokes out most other plants, and will quickly interfere with the flow of water in any channel in which it may get a start. Where it is surrounded by cultivated crops, no trouble is experienced on the above score, for during its first year of growth it is easily killed.

Paspalum has been often and strongly recommended as a drought resister, but although very hardy, it loves water, and is much more suited to wet swampy conditions than to places where droughts obtain.

CHLORIS GAYANA (Rhodes Grass).

If for any special reason there is a block of land on an irrigation farm where water cannot be obtained often during the summer period, Rhodes grass is well worth considering as a perennial crop to be irrigated for growing on that particular block of land. This grass is a good drought resister that responds very quickly to each watering, and will stand long periods of drought without dying right out. It produces roots wherever the nodes of the stems touch the surface of the ground, and so quickly covers the land; and plots are started by either transplanting these rooted sections or by seed, in each case being put in during the early spring. It is usual to use 8lbs. to 10lbs. of seed to the acre, sown for a certainty after the soil has warmed up in the spring, as the seed is not a good germinater in the best of conditions, and if put in soil that is either wet or cold rots very quickly.

Given good conditions, this grass will produce a dense mass of growth 2ft. 6in. to 3ft. 6in. high, that can either be used for grazing or be cut for hay, and as it is not very palatable to livestock when growing, being rather hard, it is better made into hay or cut and stored as ensilage. When used for hay or ensilage it should be cut just as the flower heads begin to appear.

PHALARIS BULBOSA (Toowoomba Canary Grass).

This much-boomed perennial canary grass has not been the wonderful success in Australia that was prophesied for it, but in some special conditions fills a useful position. It has always been held up as a winter-growing grass, but in our climate it makes some growth in the autumn, hangs fire during the winter, starts again in the spring, but quickly finishes on the approach of really warm weather. It appears to need a much milder climate than the bulk of South Australia experiences, and good conditions generally for it to produce much fodder. The fodder it produces is much liked by livestock, as it is soft and succulent, and it makes really good, although rather coarse, hay.

It can be started by transplanting rooted sections, or by sowing about 8lbs. to 10lbs. of seed to the acre on a fine seed bed.

FESTUCA ELATIOR AND F. PRATENSIS (Tall and Meadow Fescue Grasses).

Where perennial grasses are wanted to produce hay and provide grazing, the claims of tall and meadow fescue grasses should not be overlooked. Both of these, particularly the former, are tall-growing grasses, with comparatively fine stems, that make very fair hay, and provide good grazing. In good conditions, where water is supplied, they produce heavy crops of hay, and respond again quickly to each irrigation, giving a large supply of fodder for grazing by livestock.

The best results are obtained by seeding in the autumn, using about 15lbs. to 20lbs. of seed to the acre.

LOLIUM ITALICUM (Italian Rye Grass).

Where a plot of land is to be put under a fodder crop for a two-year or three-year period, for instance, in renovating land which has been for some years under lucerne in preparation for another lucerne crop, Italian rye grass is likely to suit admirably. In good conditions it produces heavy crops of good hay, and also supplies good grazing as well. The seed should be sown in the autumn, at the rate of 20lbs. to the acre, using the Western Wolth's variety for preference if hay crops are required.

BROMUS UNIOLOIDES (Prairie Grass).

Prairie grass, like Italian rye grass, fills a short period well, producing good hay and fair grazing, but shows to best advantage if cut and fed to livestock as green forage. It should be seeded in the autumn at the rate of about 30lbs. of seed to the acre, and as the seed is almost as large as that of the cereals, it can be sown with advantage through the ordinary seed drill. The crop gets thin very quickly when grazed by livestock, and so, if to be left for any length of time, should be allowed to seed, or else be sown in admixture with other grasses.

MELILOTUS ALBA (Bokhara Clover).

Bokhara clover, or, as the Americans call it, sweet clover, has not been grown to any great extent on good rich soils in Australia; but, judging by its behavior on poor soils in this country, and in varying conditions in the United States of America, it is destined to fill a rather important role with us. Until comparatively recently this plant was considered by many farmers as but a weed, and a rather troublesome and useless one at that; and allowed to grow in its natural conditions as an odd-corner weed, where it makes rank coarse growth, it certainly is not of very great use; but with proper handling this is not so.

Like all other strong-growing crops, Bokhara clover does best on rich, fertile soils, particularly if they are well supplied with lime; but on very poor soils, under most conditions, it will make better growth than most other plants. It is extremely hardy, being a first-class drought resister, and is not damaged by the water table rising to within a couple of feet of the surface; but it is its drought resistance, and the fact that it makes good growth on poor soils, that will make it useful to us.

Good soil preparation is necessary to obtain a good stand of Bokhara clover, and the best seed bed consists of soil ploughed up some time before seeding, so that it has time to become well compacted together again, and when the seed is put in, the surface should be loose only to the depth that it is drilled. The amount of seed necessary will depend on the proportion of "hard seed" that it contains; this hard seed does not germinate as a rule until the second year, and as the stand will depend on the germination that is obtained the first year, if much hard seed is present the rate of seeding must be increased. If most of the seed will germinate readily, 10lbs. per acre will be sufficient, but may have to be increased up to 20lbs. if much of the seed is hard. Seed can be sown either in early autumn or in early spring, but with us the former time will usually give the best results.

The crop can either be used for hay or as a pasture crop. When prepared properly, the hay made from this crop is of very fair quality, and a desirable substitute for the more valuable leguminous hays such as lucerne or red clover. The crop should be cut just before the flower heads begin to appear, for if left longer it quickly becomes coarse and woody, and is cured as hay in the same manner as is lucerne. As pasture, it makes really good fodder for all the farm livestock—cattle, sheep, horses, and pigs—once they have become accustomed to it. As it rarely causes bloat in cattle, it is a much better pasture crop for this class of livestock than is lucerne. In feeding value, it is about equal to lucerne, providing it is kept fed down and not allowed to become woody, and to prevent this it should be stocked heavily enough to keep down the growth, and livestock put back on it while the growth is still soft and sappy.

Bokhara clover is likely to be most useful to us as a crop for any poor or sandy patches that may exist in the reclaimed areas, or on the sandy land just above the swamp levels. It is also well worth consideration on any of the better reclaimed lands that are to be used to produce crops for grazing purposes.

ANNUAL FODDER CROPS.

Of annual fodder crops to be grown under irrigation there is a large assortment that is grown during the summer months from which to make choice; but it is quite other where winter and early spring crops are concerned. This is so much so that there are very few of the latter known in South Australia, and, indeed, there are only two—barley for cutting and rape for grazing—that are grown to any great extent. Within the last few years a winter and early spring fodder was introduced from Egypt, namely, berseem or Egyptian clover, which will, when the method of handling is properly understood, be grown to a fairly considerable extent.

TRIFOLIUM ALEXANDRINUM (Berseem).

This clover is grown very largely in the irrigation settlements of Egypt, and since it was introduced into Australia by Professor Perkins, in 1911, it has done remarkably well in this State wherever grown in a proper manner. At no time since it was first tried at Roseworthy Agricultural College, in 1912, has it been anything but a marked success there, and that this crop is worth consideration with a view to understand the correct method of handling it, the results obtained at the above institution for each year from 1912 to 1916 will clearly show. In 1913 one plot of berseem over an acre in extent produced more than 36 tons of green stuff to the acre, and in 1916 a plot averaged over 38 tons to the acre; for the whole period of five years the crop has averaged over 30 tons to the acre. The table following sets out the yearly returns received from this crop, together with the average for the period:—

Table Showing Yields of Greenstuff Obtained from Irrigated Berseem Clover at Roseworthy College, 1912-1916.

Year.	Area.	Total Yield.			Yield per Acre.		
	Acres.	Tons.	cwts.	lbs.	Tons.	cwts.	lbs.
1912	1.19	38	12	56	32	9	18
1913	3.201	108	19	97	34	0	111
1914	2.294	46	16	94	20	8	43
1915	3.411	98	16	66	28	19	53
1916	4.643	165	1	48	35	11	6
Means	—		—		30	5	91

This crop has been grown by quite a number of irrigators in different parts of South Australia, with varying degrees of success; but practically every case of failure into which we have had a chance of inquiring, excluding those in which some physical accident was the cause, was due to mismanagement. The causes that led up to these failures were largely owing to the fact that this particular crop needs treatment different from any of our well-known crops, and unless it is handled just as it should be, there is no chance of success. These failures, caused by lack of understanding, have frightened many people off the crop; and another point that has kept many lucerne growers and other irrigators from trying berseem is that it is only an annual; but if over 30 tons per acre of first-class leguminous forage can be averaged on comparatively poor soils like those at Roseworthy Agricultural College, with no more work once the crop is up than applying the water and cutting the crop, surely being an annual is not such a disadvantage.

The success of this crop seems to hinge mainly on the time that the seed is germinated in the ground, and on our experience this seeding period is very short, and not in the least elastic as is the seeding period for most crops grown by us; with the most of them a week or so sooner or later does not make such a very marked difference in the resulting crop, but it is quite other with berseem, a very short time at seeding making all the difference between success and failure. The plants must make a fair amount of growth before the approach of the cold weather, otherwise the main object of the crop—supplying feed in the winter—is defeated. The growth is not only retarded by being started too late, but it never catches up to the crops sown at the correct time. In South Australia this crop must be sown not later than the first week in April to do at all well, and the best results are obtained when sown by the middle of March. This fact is shown by the results obtained at Roseworthy Agricultural College last year. One plot sown on March 17th had produced 11 tons per acre by July 4th, and 20 tons per acre by August 21st; another plot sown on March 30th took until September 8th before 20 tons to the acre were cut; and a third plot, not sown until April 10th, had not produced its 20 tons to the acre until September 22nd. The final yield of the plot planted in April was only 32 tons to the acre, whilst the other two reached 35¾ tons and 38¼ tons per acre respectively.

Berseem needs a fine seed bed, and should be sown at the rate of 30lbs. of seed to the acre about the middle of March, and be immediately irrigated to germinate the seed.

Treatment of the Berseem Crop.

The after-treatment of this crop, as far as it applies to the cutting, is different from that of most other forage crops we grow, and it is because of the want of understanding this that many of the failures with the crop have resulted. With most forage crops it is usual to wait until the flower heads appear, or are on the point of appearing, before cutting them; but this is not so with berseem, and it must be remembered that the first cut should be made as soon as the crop is high enough to cut, and all subsequent cuttings as required, preferably when the crop is 9in. to 1ft. high.

To successfully grow berseem in South Australia the following rules seem essential:—

1. Seed bed to be compact, with only the immediate surface loose and fine.
2. Use 30lbs. seed per acre.
3. Sow seed during March, and immediately germinate it by irrigation.
4. Cut the crop the first time as soon as it is high enough to do so.
5. All subsequent cuttings to be taken when the crop is about 1ft. high, remembering that the more it is cut the greater will be the return of forage.

Uses of Berseem.

Berseem is very palatable, both as green forage and as hay, to all forms of farm livestock, but as more than half of the produce is taken off during the rainy season in this State, it is only the last two cuts that can be conveniently handled as hay.

Like lucerne, it is very rich in protein, and as such is always fed to advantage in admixture with other less nitrogenous foods; but, like lucerne again, stock do remarkably well when fed on this forage alone.

Its main use is likely to be, however, the supplying of a large bulk of high-class succulent feed just at the time of the year when most of our forage crops are more or less dormant.

MAIZE.

Maize is easily the most important of the summer-growing annual fodders, but it has the disadvantage in countries with a scarcity of farm labor of needing a good deal of work after the crop is up. This crop has been given much prominence of late years as a fodder, mainly by the Americans, and that principally since the making of ensilage has been brought in as an essential part of dairy farming operations.

To make the most of this crop under irrigation, the land should be well cultivated some time before seeding, and worked down to a fairly compact seed bed. Any time after the soil has warmed up in the spring—say, from the end of September to early December—the seed is drilled into the land in rows wide enough apart to allow of cultivation between them with a horse hoe, using about 20lbs. to 30lbs. of seed to the acre. If the land was watered before seeding, and the seed put in as soon as the surface is dry enough to carry the implements, it will germinate at once; otherwise an irrigation is necessary after seeding. As soon as the rows are distinct enough to do so, the furrows between the rows should be opened up, and the block given a good soaking; from then onwards water will be applied whenever it is found to be necessary. As soon after watering as the land will carry a horse, the rows should be cultivated to reduce evaporation to a minimum.

A crop of maize grown with irrigation on good soil, providing no extraordinary accidents occur, should produce from 30 tons to 40 tons of green forage to the acre.

Uses of Maize.

Maize is relished by all kinds of herbivorous livestock, providing that it is treated in such a way that they can eat it; the disadvantage it has for livestock feeding being the thickness of its stems, and so it has to be chaffed before stock can make the most of it. Its coarseness prevents it from being made into good hay, and if not fed as soon as cut must be stored as ensilage. Even stored in this way, it is still necessary to chaff it to get stock to use it to the best advantage. In either form—chaffed green forage or ensilage—it has proved itself a first-class fodder for cows in milk, increasing their flow in most cases.

SORGHUM.

Sorghum as an irrigation crop needs practically identically the same treatment as does maize, but as maize produces heavier crops of safer fodder than does sorghum, when water is plentiful, the latter crop is seldom considered when maize can be grown to full advantage. Where water is likely to be more or less limited, however, sorghum stands in less need of it than does maize, and will often give a heavier yield on the reduced supply. About 10lbs. of seed per acre, sown in rows, is necessary, and should be put in from the end of September to early December. As the plants have thick, coarse stems, it should be chaffed, and fed to livestock directly from the field, or otherwise it should be chaffed and stored as ensilage. When sorghum is grown in rich soils it is usually poisonous to livestock whilst in its young stages, and should never be used as a livestock feed until the flower heads begin to show.

MILLETS AND SUDAN GRASS.

Millets and Sudan grass are grown at the same time and in the same manner as are maize and sorghum, with the possible exception that if grown for hay the seed may be broadcasted instead of being sown in rows. They do not, however, compare with the stronger growing crops of the same kind where the conditions are good. The advantage they hold over maize and sorghum is that they are fine enough in the stems to make hay, but stored in this way the fodder is quite coarse enough that the losses in feeding are high. Millet is seeded at the rate of 3lbs. to 4lbs. per acre in rows, and 4lbs. to 6lbs. if broadcasted, whilst Sudan grass needs about 7lbs. if in rows, and 8lbs. to 10lbs. if broadcasted.

BARLEY.

Barley is a well-known fodder crop under irrigation, and is sown to produce green forage in the winter. To do this the seed is sown in the early autumn, at the rate of about 80lbs. to the acre, and is germinated by a watering. The start given to this crop before the cold weather sets in is sufficient to enable the crop to continue its growth without the check commonly received by the cereals during the winter. Barley makes such poor hay that the crop is little more use than for green forage, and is usually cut and carted to the livestock.

WHEAT.

Wheat handled in the same way as barley behaves in much the same manner, but has an advantage on this latter crop in that it can be left for hay, when some very high yields of hay are obtained on good soils.

RAPE.

Rape is also grown as a winter-growing forage crop, but because of its rank flavor, badly taints milk and its products, and so it cannot be used to any great extent for dairy cows. This same rank flavor renders it objectionable to horses, and so it is usually grown as a grazing crop for sheep, pigs, and dry cattle. If sown in the autumn, at the rate of 3lbs. to 4lbs. of seed to the acre, with ordinary luck it will produce 20 tons of green stuff to the acre.

As a forage crop, rape is much better if sown in a mixture with one of the cereals, barley, rye, oats, or wheat, and as it always has the tendency to scour livestock, a little mustard should always be grown in conjunction with it.

SOME CROPS WORTH TRYING.

Besides the above, there are quite a number of crops grown in other countries for forage which are but little known in this State, and on those farms where annual crops are gown at all some of them are well worth a trial.

CABBAGE.

In South Australia most people know to what enormous weights individual cabbage plants will reach, and the evenness of well-grown plots of them, yet still it rarely enters their heads that the crop is worth consideration as a fodder crop for stock. Sentiment seems to play a very large part with us, when deciding what shall be fed to livestock, although to nothing like the same extent that it does in some other countries, and we, unconsciously perhaps, look on the foods used by human beings as more or less sacred to them. Even if we do not go quite as far as that, the human foods are the last we think of adapting to livestock feeding. In some of the older countries it would be considered as sacrilege of the worst kind to feed wheat, which is considered as God's gift to man, to any of the farm livestock. We do not allow this to interfere with our wheat-farming operations, as we cut the bulk of our hay from the wheat crop; but still, to a lesser extent, the same feeling appears to affect us when thinking of new crops likely to be useful to us for livestock feeding. Cabbage appears to come into the above class of foods, for we freely grow its near relatives, kale, rape, marrow-stemmed cabbage, &c., but usually ignore the one most likely to give high yields of forage.

At the present time cabbages are being grown on a large scale for green forage in the United States of America, and in that country, under ordinary farming methods, yields of over 50 tons to the acre have been obtained. As yields of from 30 tons to 50 tons of green fodder are to be expected where the conditions are at all good, surely this crop is worth consideration on some of our reclaimed land.

Seed is drilled into a fine seed bed in rows wide enough apart to allow of horse hoeing at the rate of 1½lbs. to 2½lbs. to the acre. After the plants are up the rows are carefully thinned out to allow each individual plant to develop fully, and throughout the growing period the land is kept well cultivated and the crop free from weeds.

All classes of farm livestock do well on this crop, particularly sheep, cattle, and pigs.

Besides producing much heavier yields than the other cruciferous crops commonly grown, another advantage of cabbages is that the good, well-filled heads can be stacked and stored for some time, when it may be of advantage to hold the feed instead of using it as soon as mature.

TURNIPS, SWEDES, AND MANGELS.

In most countries that cannot grow forage crops to be cut in the winter, the root crops turnips, swedes, and mangels are grown in large quantities. These are sown in the spring, make their growth in the summer, and are stored for winter feeding, or, as is sometimes the case with turnips and swedes, are lifted from the soil and fed on the spot by hurdling livestock on small areas at a time on to them.

All of the above crops could be grown to advantage on our reclaimed lands. Turnips and swedes would be seeded at the rate of 2lbs. to 3lbs. per acre, and mangels at about 4lbs., and if thinned out, kept well worked and irrigated, the two former should produce somewhere round 30 tons to the acre, and the mangels a little more.

ERAGROSTIS ABYSSINICA (Teff Grass).

Teff grass has been giving satisfaction in certain conditions in South Africa of late years, and is worth consideration by us. Its main recommendation is its remarkably rapid growth, and its advantage on our reclaimed lands is likely to be the production of hay during a short period in the summer between two autumn-sown crops, or in the filling of a gap caused by the failure of a spring-sown crop. Teff is essentially a summer-growing crop, and as it is very susceptible to frosts, must not be sown until the weather has warmed up, and if started in the spring or early summer, will be fit to cut for hay in about seven weeks from seeding. Given good treatment, three cuts of hay may be obtained during the summer. As with practically all other small seeds, a fine compact seed bed is essential to the best results, and seed should be sown at the rate of 4lbs. to 6lbs. to the acre.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on January 1st, 1918:—

Butter.—Production decreased during the month of December even more quickly than usual. An extremely hot spell has brought about a shortage in tops, and consequently the quantity being produced now is not sufficient for local requirements. First grades have therefore advanced in price, though other lines are unaltered. Values in prints at the close of the month were :—"Alfa," 1s. 6d.; "Primus," 1s. 5½d.; third grade creamery, 1s. 1½d. to 1s. 2½d.; choice separators and dairies, 1s. 2d. to 1s. 3d.; fair quality, 1s. 0½d. to 1s. 1d.; well-conditioned store and collectors', 1s. 1d. to 1s. 2d.; weather-affected lots, 11d. to 1s. per lb.

Eggs.—Supplies continue to well maintain, and with fair demand rates have firmed a halfpenny, price now being:—Hen, 6½d.; duck, 7½d. per dozen.

Cheese.—Values are even lower than a month ago, heavy consignments still coming forward from the South-East. However, as previously reported, the factories there are making some of their cheese into sizes required by the Imperial Government, and although no parcels have yet arrived in the 40lb. mould, still these are now expected in the near future. Markets not only here, but in the Eastern States as well, are congested, and sales are slow at 7½d. to 8½d. per lb. for large to loaf.

Honey is more plentiful, holders now sending forward their stocks to clear before the new season's take arrives. Market is easier, prime clear extracted selling at 4d.; second grades slow of sale at 3d.; beeswax wanted at 2s. per lb.

Almonds are very scarce, Brandis worth 1s. 1½d.; mixed softshells, 1s. 1d.; hardshells, 8d.; kernels, 2s. per lb.

Bacon.—Curers have had a busy time owing to the increase in the supplies of the live animal. Fair demand has been experienced for bacon, whilst hams have had a good seasonable demand, but there is an absence of sale for any farm-cured lots, even at low figures. Best factory-cured sides 9½d. to 10d. per lb.; hams, 1s. 2d. to 1s. 3d. per lb.

Live Poultry.—For some considerable time extensive catalogues have been submitted, and during the month we held daily sales which were helpful to the trade in obtaining their supplies, also clearing birds as they arrived. Good Christmas trade has been experienced, and where quality was right nice prices were obtained; but it was disappointing that a large proportion of the birds coming forward this season should have been on the light side. Heavy-weight table roosters fetched 3s. to 4s. 6d. each; nice-conditioned cockerels, 2s. 6d. to 3s.; plump hens, 1s. 9d. to 2s. 9d.; light birds, 1s 5d. to 1s. 9d.; ducks, good, 2s. 3d. to 3s. 3d.; old and light, 1s. 8d. to 2s.; geese, 4s. 9d. to 6s.; small and light, 4s. to 4s. 6d.; turkeys, from 8d. to 11d. per lb. live weight for fair to good; fattening sorts, 6d. to 7d. per lb.; pigeons, 5½d. each.

Potatoes.—The Adelaide market has been wholly supplied from local sources. The crops are light, and in consequence regular supplies have been difficult to obtain. Onions.—Good crops are being gathered locally, and the market is very much lower than was the case a month ago. Quotations:—Potatoes, 10s. to 12s. per cwt. in the Adelaide market; onions, 6s. to 8s. per cwt. in the Adelaide market.

THE AGRICULTURAL OUTLOOK.

REPORT FOR MONTH OF DECEMBER.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—Hot weather has been experienced during this month, with thunderstorms in between. On December 11 a heavy thunderstorm occurred with a fall of 158 points of rain, the rainfall for this month, 2.33, is a record for December, and the total rainfall for the year, 26.70, is 4.29 above the previous record, the records having been kept for 20 years. Crops—The crops ripened off quickly, but will give a better return, especially on the late-sown than was expected some time ago. Natural feed is still holding out well; the late rains have kept the grass green in the low-lying places. Stock is looking well; sheep have been troubled with grass seeds on account of the rank growth. The blowflies have caused a good deal of worry. Grasshoppers came down in swarms, but fortunately the short green grass kept them from the wheat. They were also a little late, and so much damage was escaped.

Eyre's Peninsula.—Weather was somewhat cool during the early part of the month, and hindered harvesting operations, but the latter half has been very warm, with occasional thundery conditions; 15 points of rain have been recorded, which is a little below the average for the past three seasons. The total rainfall for the year has reached 21¼in. Crops—Harvesting operations are nearing completion, and despite effects of rust, yields are averaging satisfactorily. The sample of grain generally is slightly pinched. Stock generally have survived the heat waves, only one or two deaths being recorded. Pests—Mice are plentiful in the fields, but not as yet doing much damage in new stacks.

Kybybolite.—Weather—This has been a hot, dry month, there being one week with thermometer readings around the hundred each day. Crops have mostly been cut for hay; those fortunate enough to have a little grain to take off have mostly completed operations. Summer crops have generally made good progress. Natural feed has dried off, and the abundant supply of same has insured a good seeding over all pastures. Stock are all in fair to good condition.

Turretfield.—Weather—Temperatures were warm to hot during December, and on the whole weather conditions were very favorable for harvesting operations. One or two thunderstorms were recorded, accompanied by some rain, 76 points being registered on the 12th, and the total rainfall for the month was 121 points. The rainfall for the year was 22.82in. Crops—Harvesting operations are general, but crops on low-lying ground are not yielding up to expectations, and shrivelled grain has also been reported in a number of instances. Considerable quantities of hay are still to be seen in the fields. The wheat crops ripened so quickly that farmers had to abandon haycarting and give their attention to the strippers. Natural feed is abundant, but farmers are resorting to some hand feeding, and stock appreciate a change of green summer forage such as maize, sorghum, or lucerne. All stock is in good condition, and especially dairy cattle, which seem to thrive wonderfully well this season. Pests—Grasshoppers are making their appearance in the district, but their arrival is too recent to have done any material damage to date. There are some foxes, and a fair number of rabbits. Rats are numerous. Miscellaneous—Farm labor is scarce, and farmers have been put to some inconvenience owing to the late arrival of shipments of cornsacks.

Veitch.—Weather—113 points of rain have fallen during the month; Veitch average for same month is 73 points. We have had a few warm days, the thermometer reaching 102 to 104 during the period. Crops are all ready for harvesting; strippers and harvesters are at work throughout the district. The attack of red rust during October has in some cases slightly pinched the wheat sample. Natural feed is drying off. Stock are in good condition. Pests—Nothing troublesome at the present time; rabbits are to be seen on every farm.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of and to the end of December, 1917, also the average precipitation to the end of December, 1917, and the average annual rainfall.

Station.	For Dec., 1917.	To end Dec., 1917.	Av'ge. Annual Rainfall
Far North and Upper North.			
Oodnadatta	—	5·01	4·76
Tarcoola	0·55	9·20	7·58
Hergott	0·17	6·53	6·04
Farina	0·14	7·21	6·70
Leigh's Creek	0·10	11·41	8·66
Beltana	0·43	11·68	9·22
Blinman	0·25	14·42	12·83
Hookina	—	24·75	—
Hawker	—	24·10	12·22
Wilson	—	19·56	11·78
Gordon	0·30	18·89	10·26
Quorn	0·56	22·24	13·78
Port Augusta	0·34	13·67	9·46
Port Augusta W.	0·40	14·41	9·36
Bruce	0·36	15·30	10·01
Hammond	0·44	19·47	11·46
Wilmington	0·71	23·45	18·26
Willowie	0·75	19·72	11·90
Melrose	1·75	33·57	23·04
Booleroo Centre	0·79	21·80	15·83
Port Germein	0·74	15·45	12·84
Wirrabara	3·67	34·31	18·91
Appila	2·13	23·03	15·08
Cradock	0·02	17·98	10·86
Carrieton	0·56	22·15	12·22
Johnburg	0·32	18·15	10·21
Eurelia	0·40	21·57	13·24
Orroroo	0·66	22·13	13·42
Black Rock	0·50	20·73	12·25
Petersburg	1·79	23·80	13·07
Yongala	1·51	24·46	13·94
North-East.			
Ucolta	1·28	18·61	—
Nackara	0·38	17·48	—
Yunta	1·01	18·58	8·22
Waukaringa	1·52	15·87	7·94
Mannahill	0·85	13·61	8·46
Cockburn	0·10	14·79	7·97
Broken Hill, NSW	0·20	17·07	9·63
Lower North.			
Port Pirie	1·29	19·42	13·21
Port Broughton	1·82	18·90	14·33
Bute	1·04	25·21	15·42
Laura	1·69	26·06	18·22
Caltowie	1·64	23·37	17·27
Jamestown	2·49	28·36	17·46
Gladstone	2·67	26·06	16·00
Crystal Brook	1·98	23·07	15·62
Georgetown	2·28	29·52	18·32
Narridy	1·73	23·68	16·79
Redhill	1·44	25·41	16·79
Lower North—*continued.*			
Spalding	2·37	30·83	20·26
Gulnare	2·21	29·67	19·74
Bundaleer W. Wks.	2·69	29·35	17·29
Yacka	2·29	26·00	15·27
Koolunga	1·14	24·43	15·94
Snowtown	2·27	26·93	15·70
Brinkworth	1·51	26·26	15·48
Blyth	1·04	26·91	16·34
Clare	3·25	41·39	24·30
Mintaro Central	2·84	44·44	21·99
Watervale	2·61	44·82	27·17
Auburn	2·72	39·44	24·25
Hoyleton	2·17	26·86	17·96
Balaklava	2·53	21·64	16·03
Port Wakefield	1·92	19·75	13·13
Terowie	2·23	22·04	13·71
Yarcowie	1·70	23·98	13·91
Hallett	2·46	24·33	16·40
Mount Bryan	2·06	24·41	15·73
Burra	2·36	27·06	17·82
Farrell's Flat	2·95	28·78	18·87
West of Murray Range			
Manoora	2·22	31·34	18·09
Saddleworth	3·24	30·62	19·69
Marrabel	3·07	31·76	18·94
Riverton	2·49	33·30	20·48
Tarlee	1·85	27·11	17·48
Stockport	2·04	24·95	15·89
Hamley Bridge	1·90	21·93	16·45
Kapunda	2·59	28·35	19·67
Freeling	1·13	23·22	17·85
Greenock	1·59	29·21	21·46
Truro	1·46	31·71	19·74
Stockwell	1·89	28·13	20·30
Nuriootpa	1·45	27·00	21·25
Angaston	1·74	31·67	22·25
Tanunda	1·79	32·48	22·28
Lyndoch	1·01	30·09	23·01
Williamstown	1·04	38·07	—
Adelaide Plains.			
Mallala	1·34	19·43	16·88
Roseworthy	1·12	23·21	17·31
Gawler	1·04	24·81	19·21
Two Wells	0·79	16·54	16·36
Virginia	0·65	21·81	17·58
Smithfield	0·85	23·95	17·30
Salisbury	0·79	25·90	18·57
North Adelaide	1·36	34·47	21·49
Adelaide	1·02	28·90	21·04
Brighton	1·40	39·12	—
Glenelg	0·90	27·08	—
Magill	1·33	38·63	19·93

RAINFALL—*continued.*

Station.	For Dec., 1917.	To end Dec., 1917.	Av'ge. Annual Rainfall
ADELAIDE PLAINS—*continued.*			
Glen Osmond	1·16	41·30	25·26
Mitcham	1·14	34·94	23·47
Belair	1·29	40·86	28·64
MOUNT LOFTY RANGES.			
Teatree Gully	1·26	39·84	28·19
Stirling West	1·86	72·42	46·70
Uraidla	1·64	67·99	44·35
Clarendon	1·16	43·28	33·67
Morphett Vale	1·04	30·24	23·32
Noarlunga	1·10	28·94	20·28
Willunga	1·10	35·50	25·98
Aldinga	1·00	29·69	20·34
Normanville	1·15	28·37	20·65
Yankalilla	1·19	33·35	22·78
Cape Jervis	—	—	16·34
Mount Pleasant	1·31	42·53	26·87
Blumberg	1·07	45·85	29·38
Gumeracha	1·03	51·64	33·30
Lobethal	1·32	60·96	35·38
Woodside	1·19	50·85	31·87
Hahndorf	1·36	49·43	35·45
Nairne	1·37	42·80	28·83
Mount Barker	1·61	50·90	30·93
Echunga	1·65	49·67	32·83
Macclesfield	1·92	42·95	30·72
Meadows	2·42	59·27	35·52
Strathalbyn	1·43	25·79	19·28
Myponga	1·66	39·06	—
Millbrook Reservr.	1·20	48·99	—
MURRAY FLATS AND VALLEY.			
Wellington	1·26	18·10	15·01
Milang	1·56	17·21	16·08
Langhorne's Brdg	0·93	16·01	15·27
Tailem Bend	1·17	19·11	—
Murray Bridge	1·15	15·97	14·32
Callington	1·31	20·68	15·65
Mannum	0·99	13·18	11·67
Palmer	1·10	20·50	15·60
Sedan	1·10	18·43	11·92
Blanchetown	0·95	7·89	—
Eudunda	1·78	23·97	17·33
Sutherlands	1·72	15·68	10·71
Morgan	1·89	12·62	10·60
Overland Corner	1·24	13·95	—
Renmark	1·32	17·36	11·42
Loxton	1·97	19·19	10·93
Swan Reach	1·25	13·26	—
Waikerie	1·61	14·39	—
WEST OF SPENCER'S GULF.			
Eucla	1·36	12·77	10·13
White Well	0·57	12·57	9·67
Fowler's Bay	0·43	17·01	12·13
Penong	1·01	17·86	11·91
Murat Bay	0·37	14·03	—
Smoky Bay	0·26	14·35	—
Streaky Bay	0·41	20·59	15·31
WEST OF SPENCER'S GULF—*continued.*			
Port Elliston	0·50	23·61	16·49
Port Lincoln	2·06	29·99	19·88
Tumby Bay	0·74	19·59	15·00
Carrow	0·83	28·22	—
Cowell	0·38	12·66	11·76
Point Lowly	0·91	16·32	12·21
Cummins	0·35	24·34	—
Arno Bay	0·64	16·51	—
Talia	0·68	23·86	—
YORKE'S PENINSULA.			
Wallaroo	1·95	19·37	14·05
Kadina	2·05	24·78	15·88
Moonta	1·93	22·10	15·22
Green's Plains	1·92	23·07	15·73
Maitland	1·05	28·48	20·08
Ardrossan	0·61	18·18	13·89
Port Victoria	0·78	21·86	15·21
Curramulka	0·49	23·11	18·50
Minlaton	0·56	28·58	17·41
Stansbury	0·60	27·48	17·06
Warooka	0·55	28·46	17·71
Yorketown	0·46	25·02	17·47
Edithburgh	0·66	24·83	16·48
SOUTH AND SOUTH-EAST.			
Cape Borda	1·35	31·33	25·09
Kingscote	0·96	26·82	18·95
Penneshaw	1·19	23·93	21·34
Cape Willoughby	—	—	19·69
Victor Harbor	1·33	27·84	22·18
Port Elliot	1·77	26·65	20·33
Goolwa	1·61	24·93	17·93
Pinnaroo	0·93	20·58	16·74
Parilla	0·77	20·21	—
Lameroo	0·72	20·66	16·55
Parrakie	0·72	19·27	—
Geranium	0·97	22·61	—
Peake	0·97	22·08	—
Cooke's Plains	0·97	23·00	14·74
Meningie	1·15	24·70	—
Coomandook	1·09	25·80	16·80
Coonalpyn	1·48	25·28	17·49
Tintinara	1·01	26·62	18·78
Keith	0·77	24·95	—
Bordertown	0·90	26·08	19·76
Wolseley	0·61	25·52	17·72
Frances	0·31	22·18	20·74
Naracoorte	0·95	28·24	22·60
Penola	0·75	32·78	26·78
Lucindale	0·76	28·02	23·32
Kingston	0·83	32·03	24·73
Robe	0·51	30·46	24·69
Beachport	0·67	31·57	27·51
Millicent	0·89	34·73	29·25
Mount Gambier	0·60	34·48	32·00
C. Nrthumberland	—	—	26·63
Kalangadoo	0·82	37·88	—

AGRICULTURAL BUREAU REPORTS.

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Myponga	*	—	—
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Wilmington	*	—	—
Wirrabara	505	—	—
Wirrega	*	—	—
Wolowa	*	—	—
Woodleigh	*	—	—
Woodside	*	—	—
Wynarka	*	—	—
Yabmana	*	—	—
Yacka	506	—	—
Yadnarie	*	—	—
Yallunda	*	—	—
Yaninee	511	—	—
Yeelanna	512	—	—
Yongala Vale	*	—	22
Yorketown	*	—	—

*No report received during the month of December. + Formal report only received.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

COOMOOROO (Average annual rainfall, 11in. to 12in.).

November 27th.—Present: four members.

Sheep for the Farmer.—In a short paper dealing with this question Mr. A. H. Cook said he was convinced that the Merino was the best type of sheep for that district. He did not favor Crossbred sheep, because they were so destructive to fences. Most farmers in that district kept the lambs, and the high prices now obtainable for wool should be a good inducement to every farmer to give the sheep the best attention. Lambs that had been well cared for during the first 12 months would develop into very fine sheep, and he had noticed that if such sheep were sold when about 18 months old they generally realized as good a price as full-grown sheep. In concluding the speaker pointed out to members the necessity for having at all times the service of a pure-bred ram, as only by that practice would the standard of the flock be maintained.

HOOKINA (Average annual rainfall, 12in.).

November 27th.—Present: five members.

Breeding and Care of Pigs.—Mr. T. Kelly in opening a discussion on this topic, said the Berkshire-Yorkshire cross was a good type of pig. It was preferable to kill pigs for general purposes when they weighed about 14 stone. When curing was being done 12lbs. of sugar should be used to each 6lbs. of salt. He recommended pollard as a good food. When six weeks old the young pigs should be weaned and fed on milk and pollard till three months old when they could be fattened on soaked wheat and milk. Mr. Murphy preferred crushed wheat bran, and pollard as a fodder for pigs. Mr. O'Connor did not think it was wise to have the sow too fat at farrowing time. He would not wean pigs until they were eight weeks old. Mr. Henschke said the sow should have as much exercise as possible, and would feed her on lucerne.

MORCHARD (Average annual rainfall, 11in. to 12in.).

October 27th.

Mr. J. W. Riechstein read an extract from the *Journal* entitled "Co-operative Shearing." Another paper was also read from a departmental bulletin entitled "Smut, or Bunt of Wheat." Both papers brought forward an interesting discussion. In dealing with the former, Mr. McCallum expressed his agreement with the idea of three or four farmers shearing at one place. Messrs. W. A. Brown, Kitto, Tilbrook, and Jasper also spoke. In regard to pickling wheat, Mr. Kitto recommended the use of the pickling machine. Mr. Tilbrook mentioned that it was a common practice for a farmer to drop a bag of wheat into the pickling solution, and say that the seed had been pickled. That procedure was useless.

Mr. W. A. Brown emphasized the necessity for thoroughly stirring the wheat in the solution in order to break all air bubbles on the grain. Mr. Reichstein had found that feeding off the crop at certain stages would check the development of the disease.

MORCHARD (Average annual rainfall, 11in. to 12in.).

November 24th.—Present: 16 members and three visitors.

Care of Machinery.—This was the subject of a paper read by Mr. L. R. Davey. Each implement when not in use, he said, should be kept under cover. Before working the machine it was a good plan to see that all nuts were tightened and the oil holes cleaned out. Should any part or bearing be broken or nearly worn out, a new one should be ordered without delay. A block of wood placed under the off side of the harvester comb would prevent it sagging when not in use. The belts of the various machines, if given a dressing of oil, would be pliable when again placed in work. The canvasses of the binder should be loosened when haymaking was finished. Mr. B. S. McCallum, in a paper under the heading of "Finance" first dealt with the various methods one had of securing land with which to commence farming. When selecting the necessary plant for the successful working of the farm, he said, one should choose those implements that would be most suitable for the land that had to be cultivated. He admitted that the price of up-to-date machinery was very high, but on the other hand, labor was very scarce and expensive, and with the new implement one could possibly save the wages of two or three men. Even though more implements could be bought under the time-payment system, he thought that if a farmer had to go through a couple of bad seasons the fact that there were so many accounts to meet would cause him to give up in despair. On discussing the first speaker's paper, Mr. McCallum pointed out the necessity for using a good class of oil when working implements. The knotter of the binder should also be well greased when haymaking was completed. Messrs. Brown, Toop, Kitto, and Tillbrook also spoke. Mr. E. J. Kitto opened the discussion of the second paper, and said that if it were not for the credit system many farmers would be unable to carry on their work. Messrs. Riechstein, Tillbrook, Toop, and Brown also took part in the discussion that followed.

MOUNT REMARKABLE (Average annual rainfall, 23.04in.).

November 14th.—Present: 16 members.

The Veterinary Lecturer (Mr. F. E. Place) delivered an address on "Strangles and Tetanus."

Forest Conservation.—In a paper under this heading the Hon. Secretary (Mr. H. H. Davie) read the following paper:—"So much has been said and written as to the necessity, not only for husbanding our resources in timber, but for providing for an extension of our possession of growing timber, that one would think the whole community would be *au fait* with the many aspects of the situation. However, this is not so. Much that has been written concerning Australian forests, at any rate, has never gone beyond the essay or pamphlet stage. A short summary of our position may here be appropriate. We have a Commonwealth spread over 2,974,581 square miles, whilst the forest land comprises 159,375 square miles; and the whole of our woodland, good, bad, and indifferent, has an area of 627,370 square miles. Roughly, two-thirty-sevenths is forest land, carrying good-sized timber in fairly close growth; and, again, four-nineteenths of the surface of our Commonwealth carries all our timber, including patches of mulga. The essentially timber-producing countries are always approaching nearer the line of exhaustion, and more and more we shall have to depend upon locally grown timber. Our quota of the total quantity of imported timber is about 40 million sup. ft. The largest quantity of local timber sawn or hewn in this State was 436,000 sup. ft. in 1908. In 1914 the quantity had decreased to 118,000 sup. ft. That was a drought year, but the decrease is to 217,000 sup. ft. We have immense territory very sparsely timbered, a comparatively small quantity of our timber production made into marketable form (apart from firewood), and a great and ever increasing demand for dressed timber—a demand which must be satisfied by importation from overseas. The questions which suggest themselves are these:—1. Is our immense territory unsuitable for the production of timber for industrial purposes? 2. Is there little of our own timber worth the trouble of working up? 3. Are we for ever to be at the mercy of overseas producers? The opinion has of late years been freely ventilated that a self-contained nation is the most virile and resourceful, and therefore we should in this Commonwealth comprise a self-contained nation. Do you not think that we should make provision for the production of a huge quantity of our indigenous timbers, and the acclimatization of the most popular, most useful, and most beautiful varieties of the at present imported timbers? Is it not also a fact that the decorative aspect of forest conservation has nearly monopolised the view of our producers? It certainly redounds greatly to the credit of many of our worthy agriculturists that the bare monotony of some of our great plains and uplands has been relieved by an arboraceous surrounding for the homestead, and lines and clumps of sheltering trees radiating towards the boundary fences. What they still have to realise is that they must be content to do with a good deal less of present emolument in immediate wheat yield that they may receive a future recompense in a greater emolument from their forest land. There came to me an instance of a Texas man having imported and sown seeds from Australian forests on 60 acres of his land, and at the end of 20 years he was able to cull from his forest and trade away valuable timber, which with its by-products brought him an income of £200 a year clear. I have said that the ornamental is largely being sought in the farmers and settlers' afforestation plans—or at least that which, given a start, can take care of itself. The quick-growing sugar gum has been most frequently chosen by planters. Though this gives a good girth of fairly durable timber in a short time, the sugar gum is unworthy of comparison with our blue and red gum and the jarrah and karri of Western Australia. The objection to some of these famous timbers is their slow habit of growth. But they are timbers which we cannot afford to dispense with; and each year that follows their planting brings nearer the fiftieth year of development, when a grateful posterity will bless the foresight of their forbears of the earlier decades of the 20th century. We realise that the planting and care of special forest reserves is a matter of Government policy, but we must awaken and nurture a strong public feeling on the matter of forestry, so that no Government can be hampered by lack of funds, or the hearty co-operation of the people. The specialist and his workers will look after the development, extension, and exploitation of the forest reserve area; but there must still be felt the responsibility of each individual producer to supplement the area of special forest growth by his own timber reserve and plantation. We have fine forests and capable officials at work now upon our forest reserves; but we must give them far more scope in complying with the demand of the builder, the cabinetmaker, and coachwright, and attack the salient with much larger and better equipped forces. We are training young foresters. Why not give each forestry undergraduate a year or so to set out a little forest reserve of his own of two or three acres? Then, when he has secured his B.Sc. or diploma passes, let him continue to develop his work for, say, two years, quite unaided. By that time he will have proved himself to his superiors, when he could have an "honors" in practical work attached to his degree, and could be safely trusted with the management of a large forest reserve or a section thereof; whereas a man with mere academic distinction in the science might (too late to save expense and trouble) be shown to be incompetent to secure practical success. Then, so that the necessity for care of and provision for the supply of timber should not be overlooked by the general body of settlers and agriculturists, the students at agricultural colleges might have this subject added to their course of instruction. A bonus might be given to each manufacturer of furniture and appliances who reaches a certain output and variety in his wares that are made exclusively of native timbers. Years ago, when one roamed the Mount Lofty ranges, one could get a handle for a maul, or pick, or hay fork from native wood, which for spring and durability could rival the imported ash and hickory. But these timbers were constantly culled without being replaced, and I am afraid are now rare indeed. This helps to prove that the timber is such as may be conserved and used by manufacturers. With regard to a bonus—we may remember that Germany had captured much of the world's trade, using bounty-fed goods as the snare. Much of the oak moulding and furniture sold is our humble friend the stringy bark in his holiday suit. In conclusion I may say that we have a striking example of the benefits of applied forestry in India. Let us emulate it. We cannot refurnish the huge trunks of trees, which in the course of settlement have been pulled into lines miles in length and fired. The settlers of those days were not in a financial position to save all the valuable timber. But the big squatter or the Government could have done so; and to-day have had the residue of perfectly-seasoned timber of 30 or 40 years' seasoning. Let us see to it now that every man who takes out a tree plants two young ones or more. Willowie had no huge sand-drifts when it had its quondong scrub. South of Strathalbyn a belt of land known to the early pioneers as having regular rainfall has since its clearing had a dodgy and sparse rainfall. Trees keep the ground shaded and cool, and retard evaporation, and the deposit of dew is assisted. The creeks which deeply scour the foot of hills such as at Salisbury, Gawler, Willunga, have no timber belt to retard their erosive process. Forests are factors in retaining the soil on mountain slopes particularly. In the first quarter of the 19th century 100,000 acres of forest taken from the mountain slopes of the Alps, Cevenaes, and Pyrenees resulted in 8,000,000 acres or so of fertile land at the foot of the mountains being destroyed and silted over. Trees form good shelter for stock. As some of our districts have a none too abundant rainfall, we need to co-ordinate our water conservation to some extent with our forest conservation. We *must* have timber for our industries. As far back as 1881 the world's consumption of hard wood reached 250,000,000 tons, and of pinus or soft wood, 1,250,000,000 tons. We must have the timber. Let us raise it, and keep its revenue in our homeland. Let us add to our population by supplying the means of livelihood to many families by growing all, or nearly all, our own timber.

QUORN (Average annual rainfall, 13.78in.).

November 30th.—Present: six members.

Harvester versus Stripper.—The following paper was contributed by Mr. J. E. Schnell:—"In considering the relative value of these machines in connection with the harvesting operations, a fairly wide scope of controversy is opened up, viz., the uncertainty of some northern districts to produce 6bush. to 8bush. crops on an aggregate of four or five years; hence the enhanced value of cocky chaff as a fodder, and also when a crop gets below 6bush. in yield it is rather difficult to regulate the combined harvester to turn out a saleable sample without blowing a considerable amount of wheat away; also, in stony and hilly country it is rather a cumbersome machine for a light crop. Under such conditions I would give preference to the ordinary stripper. In such districts where wheat-growing is not altogether payable, the price of machinery is a big factor in the retention of the old stripper, very often resulting in considerable loss to the farmer by having the wheat damaged in the heaps through rains, which fact was amply demonstrated throughout the North last year. It is possible to cope with, say, 1,000 bags of wheat if caught in rains, but not so easy with the same in heaps without resulting in heavy loss to the farmer unless plenty of labor is forthcoming. Under normal conditions the dominating factor in connection with harvesting operations is economy, and to my idea the harvester or reaper-thresher is the embodiment of such an ideal. In dealing with a crop of, say, 1,800 bags, the difference in the price of a harvester compared with the stripper would be more than saved. For instance, to let 1,800 bags at 6d. per bag for cleaning would total £45. Three men's keep, allowing 100 bags per day for three weeks, and allowing £1 per week for each man, means an extra £9, bringing the total to £54. To let sowing after harvester would cost not more than £11, leaving a difference of £43 in favor of the harvester. Also, we must not overlook the fact that wheat reaped and put in a heap loses weight considerably, which is only regained in the winter, or on the ocean to home ports. As nearly as my experience permits me to judge, I would put the gain or saving in weight per bag at 3lbs. for wheat reaped with the harvester. The present price of 4s. per bushel on an 1,800 bag crop would represent a gain of £18 to the farmer. Add this £18 to our £43 balance, and it gives a clear profit of £61 on the harvest expenses, which is a low estimate. Also, with ordinary care, the depreciation through wear is little, if any, more with the harvester than the ordinary stripper." Mr. Brewster also read a short paper dealing with the "Wheat Standard."

TARCOWIE (Average annual rainfall, about 15½in.).

November 27th.—Present: 10 members.

Bees on the Farm.—Under this title the following paper was contributed by Mr. A. Shrowder. It was surprising, he said, that more farmers did not carry a score or more hives on their holdings. As for a market, there was an unlimited demand for honey in the United Kingdom. After referring to some of the native honey-producing plants, the paper continued:—"In our mild Australian climate the expensive and troublesome system of wintering bees is altogether unnecessary, the bees are left to go into the winter with 20lbs. or 30lbs. of honey in each hive. This, with that which the bees can gather during the winter, is sufficient to keep them strong. If a swarm should come out too late to gather enough winter food before the flow ceases, there will always be surplus combs of honey in the apiary to give them. The expression 'robbing bees,' is incorrect, because an apiarist does not rob his bees; he simply removes portion of the surplus honey which the bees store up against the time of scarcity. The flows of honey come periodically, depending a good deal on the weather. When the honey plants are blooming freely the frames will be seen to be filling up with honey. They are removed before they are completely filled, so that the bees will not be crowded for honey room. If honey is coming in freely, and there is no room for it, the colony will cast out a swarm to seek another home. This swarming depends a good deal upon the strain of bees, but more upon the management. A good strain of bees, properly managed, will rarely swarm. Beehives are invariably two-storied. The old-style box hives when filled would send out swarms, simply because the bees had not room enough to store their honey. Modern methods of management seek to discourage swarming and to encourage the bees by expansion of the hive to keep on storing honey. A strong colony of bees will, as a rule, gather more honey if it can be kept from swarming. The lower story in the hive is the brood chamber. This is the domestic shrine of the queen bee; here she lays her eggs, of which she lays from 2,000 to 3,000 a day in the height of the season, and it is here the bees congregate for warmth during the winter. Every bee in the hive has its especial task to perform. There is a regular army of housekeepers who clear away the refuse and expel any dead bodies and generally keep the house pure and sweet. Then there are the nurses, who take the food to the brood chambers, and tend the young. Bees have a peculiar sense of responsibility. The young bees supply the wax. Their erected structures are marvellously exact. At the door of the hive are sentries inside and out; they keep guard unremittingly. The female workers' password is their colony odor and their load of nectar and pollen. A worker's life is only about eight or 10 weeks. Her wings become worn away with flying. The strenuous task of supplying ventilation also has this pathetic effect on the fanners as they are called; their sustained effort of fanning is extraordinary. The only bee which does no work in the hive is the drone; his one function in life is the perpetuation of the race, and even this is only performed by one of the many hatched in the hive, by that one who overtakes the queen on the only occasion she ever leaves the hive; except, of course, when she follows the swarm in seeking a new home. The upper story, or the super, is separated from the brood chamber by a queen excluder. This is a sheet of perforated zinc, which admits only the workers. If the queen got into the super she would immediately turn it into another brood chamber, and if the drones got in they would gorge themselves of the golden store. The super represents the profits of the hive, and each frame in it should contain approximately 6lbs. of honey. It is quite possible for a man who knows his work and has proper appliances to look after 200 hives. Most of the unpleasant features of keeping bees have been eliminated by the modern methods of handling them. Still more has been done by perfecting the bees themselves. With a good smoker to quieten the bees, and with proper protection, it is just fun to handle them. The sting of the bee is an important factor in preventing over production of honey. There are many persons who have an almost unreasonable fear of bees, or rather of getting stung, and yet there are very few people to whom a sting causes more than a sharp pain for a short time, and some little discomfort through swelling of the affected part. The purpose of this paper is to invite attention to the subject of bee culture. Any district which produces lucerne is especially suited for bees, and farmers, while deriving great advantages from their lucerne, may perhaps still further improve their position by introducing the busy little bee. The returns from honey and beeswax probably amount in value to £20,000 or £30,000 at the present time, and I estimate that this value can be increased to £400,000 for South Australia. A goodly sum of money, not counting the pleasure and health gathered therewith.''

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 18in. to 19in.).

November 26th.—Present: eight members and one visitor.

Purchasing Farm Implements.—Mr. A. Bartrum, in a paper on this question, said one of the most important items in purchasing machinery was to obtain the machines from a firm from which duplicate fittings and bearings were easily procurable. He would like to see more field trials and working exhibitions of farming implements held, as they enabled the purchaser to see what class of work the machine did that he intended purchasing. When one intended buying an engine it was a mistake, he said, to purchase one of a small horsepower. It was much better to have power in reserve than to be always running the engine at its fullest capacity. The portable type of engine was preferred, because it could be used for all purposes. He did not think the time far distant when tractor power would be used for much of the work on the farm.

BUNDALEER SPRINGS.

October 24th.—Present: 11 members and one visitor.

Apiculture.—Mr. G. H. Solomon, in addressing the meeting on the subject of ''Apiculture,'' stated that the most important factor to be considered when installing a bee farm was the selection of locality. There should be sufficient of both nectar and pollen-yielding plants. A well-sheltered, low-lying spot should be selected, with good drainage and plenty of water. In the first warm days of spring all colonies should be inspected, and all brood and stores equalised, and an endeavor made to get all colonies strong and in good shape for the honey flow. There should be from 40,000 to 50,000 workers in a colony to ensure a successful season. Every precaution should be taken to prevent swarming so that a maximum supply of honey would be secured. If a swarm issued it should be watched and taken as soon as it settled. When the brood chamber was full of bees, and honey commenced coming in, a queen excluder should be placed over the brood nest and over it a super of empty extracting combs. When the main honey flow had fairly set in, and colonies were in good condition, a second super should be put on before the first one became overcrowded, and before the queen cells were started. No honey should be extracted until refined by the bees.

REDHILL (Average annual rainfall, 16.79in.).

October 30th.—Present: 10 members and one visitor.

Dairying on the Farm.—Mr. J. A. MacAvaney, who contributed a short paper on this subject, spoke in favor of the milking Shorthorn as a good type of cow for farm service. Fowls should be kept, and with good care and attention would prove themselves very profitable. He suggested keeping Buff Orpingtons for the table, and White Leghorns for laying purposes. He suggested that every farmer who kept cows should have two or three good Berkshire sows. If crossed with a Middle York boar the pigs would always find a ready sale in the market. Mr. Steele, in discussing the paper, said the making of cheese should be undertaken. It had been proved that the Ayrshire cows were a good breed for the production of cheese. Mr. T. H. Torr said the abundance of good green feed which grew in that district made it specially suitable for dairying. Pigs should also be kept in conjunction with cows. Messrs. W. Pengilly, W. B. Torr, and Harris also discussed the paper, and agreed with the views expressed by the writer.

WIRRABARA (Average annual rainfall, 18.91in.).

October 27th.—Present: 14 members and two visitors.

THE BOY ON THE FARM.—In a paper on this subject Mr. W. J. Barbary dealt with the question of the education of the farmer's son. When the boy was of a school-going age he should be sent to school regularly, he said, and his home duties made as light as possible. Saturday should be recognised as a holiday for him. If finances would permit, a course at either the Agricultural College or the School of Mines would be of great benefit, in that he would come into contact with men of wider experience than he could possibly meet if kept on the farm. When schooling was finished every endeavor should be used to awaken an interest in the working of the farm. He thought the present of a mare, with which he could start to breed a team for himself, or a field on shares was a step in the right direction. Another good idea was to discuss the working of the farm with him and ask for his opinions.

WIRRABARA (Average annual rainfall, 18.91in.).

November 24th.—Present: 14 members.

LAMPAS IN HORSES.—In a paper dealing with this subject Mr. P. J. Curnow said lampas was congestion of the blood vessels in the lining membrane of the palate. In young animals it was chiefly caused by irritation set up by the growth or changes of the teeth. It might also occur in horses at work from inflammation set up by bit injuries, and in old horses from irregularity of the teeth. The soreness so caused would prevent the horse from properly masticating his food, and the inflammation would give rise to feverish symptoms. Where the inflammation and soreness was due to dentition no treatment was necessary, except to put the animal on wet bran or other soft food for a few days. Where the injury was caused by the bit it should be removed and the horse treated as above. Lampas in old horses was generally caused by some irregularity of the teeth. That difficulty could be removed by the rasp, and the horse again fed with soft mash for a few days. In cases where the congestion was excessive and caused the palate to project on a level or below the table of the incisors, free scarification, which consisted of superficial incisions with a lancet, would afford immediate relief. Many experienced horse-owners did not claim success for the latter method, alleging that the growth again returned after a little while, and the lancing had to be repeated. That was quite true in many cases, but even that method was much preferred to the old brutal method of burning out—a plan now debarred, and rightly so, by law. The burning was claimed to permanently destroy the tendency to lampas, but it did more, for in many cases the palate was utterly destroyed, and when a horse was refractory during treatment there was a chance of burning the animal's tongue, which would cause a most serious injury. Where scarification had to be done it was not wise to attempt the work unless one had had some experience in the use of the lancet, because there was always the danger of cutting the patient's tongue or doing some other injury. In the hands of a skilled man the lancing method was preferred to any other in the treatment of lampas.

WHYTE-YARCOWIE (Average annual rainfall, 13.91in.).

November 24th.—Present: eight members and three visitors.

CONSERVATION OF FODDER.—Taking this question for a title the Hon. Secretary (Mr. W. G. Mudge) read a paper in which he pointed out that although in Australia there was good stock-raising country, the fact that it was subject to droughts every few years made it necessary that stockowners should endeavor to protect themselves during bad seasons. The very high price of iron at the present time prevented many farmers erecting suitable accommodation for the storage of fodder, but he would suggest building a room of stone, with a concrete floor (only a few sheets of iron would be needed for the roof) and if finished off well, would be mouse and weather proof, and would enable one to store a considerable amount of grain. When cutting extra hay to serve as a stand-by, he advised members not to use oaten hay, because the mice were very fond of it. If wheat or barley were cut on the green side he did not think they would do so much damage to the stack. He also spoke of the advantages that were to be derived if one could install an ensilage plant. There were many farms in that district where he considered lucerne could be grown, and a stock of such fodder would be almost invaluable during a drought. A stack of straw could also be turned to good account when other feed was scarce. A general discussion followed, in the course of which Mr. Jenkins recommended farmers to sow a few acres of barley every year for green feed. Mr. Lock expressed a preference for oats. Mr. Robinson advised adequate reserves of hay, straw, and chaff.

YACKA.

November 24th.—Present: 11 members.

Black Oats on Wheat Land.—In the course of a paper on this subject the chairman (Mr. E. Atkinson) said the loss sustained by many farmers through the "black oat," or commonly called "wild oat" growing on wheat lands, was increasing. This pest was very troublesome, because the seed lay dormant in the ground for a long period, usually until wheat was sown, when favorable conditions caused it to germinate with the wheat. It grew very fast, and stooled out quickly, and if the weather was at all dry during spring, the oats robbed the wheat plant of a great deal of moisture. Damage was also caused when the wheat was ripening by the tops of the oats curling around the heads of wheat and breaking them off. In many instances farmers had to cut the wheat crop for hay on account of the quantity of wild oats growing in the crop. In order to eradicate the oats one should endeavor to get the seeds to germinate by continually working the ground. If a crop of wheat had been grown on land that had been overrun with oats, he advised burning the stubble and cultivating the land during March. After the first rain had fallen a set of harrows should be run over the land, and when there was a sufficient growth of oats it could be grazed with sheep until fallowing time. In the ordinary routine of farm work that would be directly after seeding, and if that could be done in June it should be well ploughed and then thoroughly harrowed. That was most important, because it would help to make the soil fine, and leave it in a condition fit to hold sufficient moisture to germinate another crop of oats. It would be noticed that the first crop had been ploughed in, and if the harrowing was done by the end of June another germination would take place by the middle of July. The land should next be cultivated when sufficiently dry to kill any young plants, and if harrowed again and rain fell, one would be fairly certain of getting the third germination during August. The third growth could be killed by again cultivating and harrowing. During March the harrows could be run over the fallow of the previous spring, and the first rains would soon prove whether any more oats were left to germinate. Another working of the land would kill the fourth crop, and the final cultivation, given during seeding operations, would make the fifth attempt to eradicate the "wild oat" during one year.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT)

LONE PINE.

December 4th.—Present: 22 members and five visitors.

Building Haystacks.—Mr. C. Beckmann, in a paper dealing with the building of haystacks, said the first essential was to procure some nice, handy forks. The hay yard also needed attention, all refuse, such as damaged straw, &c., should be removed and green growth should be cleared off. A well-drained, dry position should be selected, and the base for the stack should be covered with timber, if possible, but if timber were difficult to obtain a thick layer of straw would answer the purpose. The middle should be kept well up, in order to allow the stack to spread a little as it settled down. Before putting on the roof, a ring layer of sheaves should be placed projecting about 6in. all round, forming the eaves. A load of nicely-tied, long sheaves should be kept back for that purpose. Before roofing an extra high layer should be built in the middle, and it should be fairly steep, in order that, as the sheaves were laid on the roof layer by layer, they would be all sloping outwards, an arrangement which caused rain falling upon the stack to run until it dropped over the eaves clear of the stack. It was inadvisable to build too wide, and it was a better plan to build higher, or make the stack longer. If the stack was a small one and run up quickly, the walls should be fairly straight, because they would give out as the stack settled. If the stack were a large one it would be as well to give it the outward leaning desired, because it would remain as made, except that the ends would squeeze out, so that it would be necessary to be careful not to allow them to project too much. An interesting discussion followed the reading of the paper. In reply to a question the writer of the paper expressed a preference for the round stack. Members generally agreed with the points expressed in the paper.

NANTAWARRA (Average annual rainfall, 15.90in.).

November 29th.—Present: 12 members and five visitors.

Takeall.—The meeting took the form of a discussion on this question. Mr. R. P. Uppill tabled samples of wheat which he considered were affected with takeall. The piece of land from which the samples had been taken was fallow that had been well worked, but late in the season rain had fallen and he had cultivated the land, only to find that it had been worked too deeply, and the land had come up in long wet flakes. Although some of the crop had benefited there were several spots amongst it. He had noticed that they seemed to spread with each rain . The root system was very poor and sickly and the ends of a number of the roots appeared to be diseased. Mr. S. Sleep remarked that some of his wheat was badly affected, but it was on land that had only been lightly worked. Mr. J. H. Nicholls had noticed the disease in patches where he had tried to kill the wild turnip. Mr. P. Nottle reported it to be badly affecting his crop on limestone soil, where the land had been raked and stone dug out of the ground for road-making purposes.

WATERVALE (Average annual rainfall, 27.17in.).

November 19th—Present: 15 members and 20 visitors.

The Dairy Expert (Mr. P. H. Suter) attended the meeting of the Branch, and delivered a lecture on "The Management of Dairy Stock." The chairman (Mr. A. S. Burgess) also gave a short address, in which he mentioned that the Branch had been in existence for 25 years. They had five life members, seven members on active service, one having paid the supreme sacrifice. An opportunity was also taken of presenting to Mr. W. Smith a life membership certificate of the Agricultural Bureau. That gentleman had to his credit 20 years' service as a member of the Watervale Branch of the Agricultural Bureau.

LYNDOCH, November 29th.—The Principal of the Roseworthy Agricultural College (Mr. W. J. Colebatch) attended the meeting and delivered an address on "The Breeding of Horses."

YORKE PENINSULA DISTRICT.

(TO BUTE.)

BUTE (Average annual rainfall, 15.42in.).

December 4th.—Present: 11 members.

The Value of a Drought.—Mr. H. N. Paterson, in a paper in which he discussed the value of a drought, stated that few people cared to discuss any possible merits of such a visitation. "Whatever may be said to the contrary," the paper continued, "drought does teach a number of lessons, and nothing seems more certain than that, whatever the lessons may be, one and all are soon forgotten with the return of good seasons. It teaches them to stock more lightly, to create reserves of fodder, to build up their flocks afresh from the survivors (they being by reason of their escape from death the fittest of all from which to breed). Assuming drought to be of normal proportions, and not so abnormal as the last one, the long-sustained rest given to the land is of some benefit to it. These dry conditions suppress numerous diseases, and generally sweeten up pasture. During the currency of this last drought, several stud-masters in South Australia realised how slow they had been in the matter of making provision to carry their stock over any such visitation. The provision made, in the matter of food conservation, was little enough in itself, but that of establishing even some small system of irrigation where water was plentiful was even less. It is to be hoped that they will never again be caught in the same manner, because after all, on nearly every one of these places not only is the supply of good water abundant, but the soil is of a kind which only requires moisture to bring out the best that is in it. The last drought has also taught some stock-owners more about the economical feeding of their sheep and cattle than anything else with which they have had previous experience. One and all seem to have realised that whereas lucerne hay is the most general foundation of every battle with the drought in the adjoining States, it is a commodity of which very little locally-grown is procurable. With so much land available in various parts of the State upon which to grow lucerne, it must have been forcibly brought home to all and sundry that much of their expenditure on this particular form of fodder represented freight and other expenses incidental to importation from beyond the State. This last drought has also taught several flock-owners how to keep their sheep alive by distributing grain throughout the paddock, and that in order to get the best results from grain something in the form of bulk, either rough grass of no special value or hay, must also be within reach. Those who have suffered have also learned how to feed, and when to feed, how to even up the daily ration so that the strong may not get all and the weak get none. Those who have had to cut sheaoak and other forms of edible scrub have also by this time been forced to realise the importance of paying some degree of respect to the tree itself, of lopping the branches lightly, here and there, instead of cutting down the whole growth in a reckless and improvident fashion. During this last experience, great quantities of bran have been consumed in some districts, one lesson of a drought on a previous occasion having taught some flock-masters that bran had special recommendations as a diet for starving sheep, in conjunction with some form of roughage. The lesson learned was that the strong sheep could not eat more bran than the weak, and that if a stated amount were distributed among a certain number of sheep and fed to them in troughs, the likelihood of each sheep in turn getting the same quantity was more certain in connection with bran than with any other known substance. One anomaly of this last season was the price of wheaten hay compared with lucerne hay, the former being infinitely the dearer of the two. A given weight of lucerne hay contains roughly one-third more nutritive material than the same weight of wheaten hay. The reason of the more valuable article of the two being the cheaper on this occasion was largely due to the fact that a particularly good season was experienced along the north-east coast of New South Wales, more especially in the West Maitland District and along the valley of the Hunter, where immense crops of lucerne are annually grown. The rains which brought these crops into being were useless for producing wheaten or oaten hay. It is not often that lucerne hay is more abundant than any form of hay, but it was so in this instance in this particular part of New South Wales. During this last dry season the dairy farmers learned to appreciate the value of bran more than some of them had previously supposed to be possible. These men learned that bran could be fed in considerable quantities to cows with perfect safety. If there is one thing more than another which drought drives home to the understanding of all engaged in stock-raising it is the folly of placing unlimited confidence in surface waters such as open tanks and dams. The loss by evaporation is so great during a drought that all estimates as to the prospective endurance of station tanks are completely disorganised; when droughts set in, it is no time for a man to be hunting round for convenient sites for sinking wells. He must attend to this work when the seasons are good, and have everything of this description in readiness, as one of his back lines of defence, when the usual trouble happens along. Another lesson which some have absorbed to their advantage on this last occasion has been the wisdom of so arranging the next lambing that the ewes should be spared from this ordeal until later in the season than usual. In several places where rain has fallen during the last few weeks the postponement of lambing, through the exercise of this foresight has been of signal advantage.'' The paper gave rise to an interesting discussion. Messrs. Buchanan and French both referred to previous droughts and their effects. The Hon. Secretary (Mr. L. E. Simon) expressed the opinion that it would pay every farmer to cut and bind a quantity of straw each year. A few heaps of cocky chaff well covered with straw also constituted an asset on the farm. Messrs. A. E. Bryant and McEvoy also spoke.

WESTERN DISTRICT.

EDILLILIE.

November 24th.—Present: 10 members.

Stock-raising.—Mr. T. B. Turner, in a short paper on this question, said that breeders of horses should endeavor to secure the services of the best horse travelling the district, as a good foal would cost no more to raise than an inferior one. In choosing the mares, from which to breed, he thought roomy animals should be given preference, as they would not have so much difficulty in foaling, compared with close thick-set mares. If the mares did not take the service during travelling season he considered it a good plan to try them again during February or March. It was essential if one desired to breed good horses that the young foal should be well fed and cared for. In the discussion which followed Messrs. J. Vonow, A. P. Quinn, and A. Hill agreed with the paper. Mr. T. Knight was not in favor of summer mating. Mr. P. T. Crawford contended that foals obtained from summer mating could be reared to good horses if the mares were properly fed whilst rearing the foal. An important point in starting with young mares was to select a stallion with a small head if possible. A good type of horse for farm work could be obtained by mating a heavy draft mare with a blood stallion. In reply Mr. Turner said that a foal dropped in March or earlier had an even better chance of doing well than a spring foal, owing to its getting a full season of green feed when weaned, whereas the spring foal arrived when feed was beginning to dry off, and when weaned had only dry feed. Shy breeders could be started by mating with a blood horse, and would then invariably continue sure breeders. He favored the heavy draft for farm work.

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

November 24th.—Present: eight members.

Settling Soldiers on the Land.—In the course of a paper dealing with the question of settling returned soldiers on the land, Mr. T. Cowley suggested that there should be committees formed in country districts, either in connection with the local Branch of the Agricultural Bureau or some kindred association, the committee to be subdivided into units which could deal with finance, land values, agreements, implements, horses, sheep, &c. Each of these subcommittees would be available in their respective departments, as a source of help and advice to the settler. In the course of the discussion which followed Mr. A. Chilman expressed himself as in agreement with the principle of the scheme as outlined in the paper. Messrs. R. T. Mills, G. F. Wake, H. Wheeler, J. Wake, and Mills also spoke.

GOODE (Average annual rainfall, 12in. to 13in.).

November 28th.—Present: 17 members and three visitors.

Destruction of Rabbits.—Two papers were read dealing with this subject. Mr. P. W. Hunt stated in the course of a paper which he contributed, that a good deal in the way of destroying rabbits could be done with strychnine mixed with pollard or jam or in many other well-known ways. The use of gas, although expensive, was effective. Another practice was to dig the shallow burrows of the warren, and then set netting traps at the entrances which have not been destroyed; at the same time using dogs for the purpose of picking up the "outsiders". The most effective, but a somewhat tiresome procedure, was to dig all tunnels to a depth of 3ft., and into that hole pile dry earth, that would commence to run immediately rabbits inside attempted to scratch out. His attempts to use bisulphide of carbon had not been successful. The question was then taken up by Mr. L. Will, who, in the course of his paper, urged as of primary importance, a weekly inspection of the netted boundary of the holding, effecting the necessary repairs and filling in burrows. That should be done in dry weather. The mouth of the burrow should be cut down with the shovel until it was blocked. A small mound of loose earth should be erected over the hole, and for a few days, whenever that subsided into the hole, it should be added to. Phosphorized pollard should be spread around to destroy any rabbits outside that might otherwise attempt to open the burrows. Similar baits could also be used around the boundary, wherever the pest had holes of ingress and egress. The best method of laying the pellets was to throw up with a shovel a few spits of earth on a place that the rabbits frequented. Into the hollow thus created a few pellets should be dropped, and then just covered. In order to make the pellets he suggested putting ¼gall. of water into a bucket, then adding two table spoonsful of bisulphide of carbon; dropping in half a stick of phosphorus, and when dissolved, adding another ¼gall. of water, into which a teacupful of honey had been dissolved. Pollard should then be dropped and stirred in until it reached the consistency of fairly stiff dough. It should then be cut into squares or pressed through a sieve, and dropped into dry pollard or flour. A general discussion followed, in the course of which members expressed the view that if all settlers co-operated in distributing poison, much good would be done.

GREEN PATCH (Average annual rainfall, 26.56in.).

November 26th.—Present: seven members.

Best Class of Sheep for District.—Mr. K. J. Hyde, in a paper dealing with this question, said although the Merino took first place as a wool-producing sheep he favored the Lincoln-Merino cross because sheep of that class produced large-framed weighty lambs, which carried a good fleece of wool. He also spoke of the Romney Marsh cross for the lamb trade, but as there was no local demand for large quantities, and because transport was scarce and freight very high, he thought the first-mentioned cross the most suitable class of sheep for that district. If young ewes were used for breeding Crossbreds great care should be taken at lambing time, as very often they would need help. A ride around the flock would result in many ewes and lambs being saved. It was a good plan to have a number of small paddocks to enable the sheep to have a frequent change of pasture. Not only would they then do better, but the practice would help to keep the grass sweet. He urged the necessity for dipping the flock regularly. Beside acting as a preventive against blowfly and killing tick, it greatly improved the value of the wool. To obtain the best results one should not dip off shears, but allow two to three months to elapse for Merinos, and six to eight weeks for Crossbreds or long wools. Points to be avoided were that the sheep should not be dipped during the heat of the day, neither during cold wet weather. It was advisable to yard them for several hours prior to dipping. Mr. Sinclair tabled a Merino ram's fleece, the wool, which was of excellent quality, weighed 21lbs. The animal had secured first prize at the Yallunda Flat Show.

MILTALIE (Average annual rainfall, 14.55in.).

October 27th.—Present: eight members and one visitor.

Homestead Meeting.—The meeting was held at Messrs. Story Bros.' residence, and a paper on "Fallowing" was contributed by Mr. W. P. McEarchen. He thought that to obtain best results one should commence fallowing as soon as possible after seeding. Ploughing should be done to a depth of 3in., and the land left in a rough state and kept well stocked with sheep until about September or October. After the first rain had fallen it could be cross cultivated. The sheep could treat the land almost as well as the harrows. All that was then needed was to run the skim plough over the land to form a good seed bed. The best method of drilling was with either the disk or hoe drill, because the seed could be sown to an even depth. If the ground had a tendency to set, it was not advisable to use the harrows after seeding. Land that was intended for hay should have the stumps and stones cleared off, and if the ground was of a light nature, rolling would be beneficial. The binder should be thoroughly overhauled before commencing haymaking operations. He was in favor of the harvester as the best method of gathering the grain, because one was able to start much earlier and the cleaning and bagging was done in one operation. He also spoke of the value of having several sidelines on the farm. Mr. W. S. Smith exhibited a contrivance for scrub-burning which consisted of a piece of ¾in. gas pipe about 4ft. long, slightly bent at one end, and filled with kerosine. Each end of the pipe was plugged with cotton waste to serve as wicks. It was claimed that two bottles of kerosine would keep the wicks burning for 12 hours. Another item of interest exhibited by the same gentleman was a ½in. bit with ⅜in. of the point of the worm filed off. It was claimed that the bit would bore through green and very hard wood without choking.

MINIPPA.

December 1st.—Present: seven members and three visitors.

A Handy Spreader.—Mr. C. H. Cook, in a short paper under this heading, brought before members a spreader that could be fixed to any set of chains. The spreader was made from an old piece of gas or water piping. Two small holes should be made about 2in. from each end of the spreader. Bows should be made out of spring steel or good spring wire, leaving the ends just sufficiently turned to come through the holes to hold the chains firmly in their places. The bows should be put through the link of the chain and pressed into the ends of the spreader until the two short ends sprung into the two holes in the spreader.

SALT CREEK.

October 27th.—Present: 13 members.

Making Swingletrees.—The Chairman (Mr. C. Venning), in a short paper dealing with this question, said the timber generally used for the construction of swingle trees on scrub farms was mallee. If good timber was selected and a little trouble taken, a good set could be made, but the swings would be rather heavy. He preferred to use sawn timber, as it was much lighter, and would be cheaper in the long run. The tools necessary for the work were an adze, saw, rule, brace and bit, and a spanner. The cost of an eight-horse set made from sawn timber would be about £2 10s. The writer thought much would be done to prevent sore shoulders on the horse if the team worked with light swings. In the discussion that followed, Mr. W. Gale said he had always used mallee for swings, because sawn timber swings split at the ends. Messrs. A. Venning and Frost also spoke in favor of sawn timber swings. Mr. R. S. Frost read a paper on "Rabbit Destruction." In discussing the paper, Mr. A. Venning said he had obtained good results from poisoning, even when there was plenty of green feed about. He thought the baits should be mixed by hand rather than with the machine.

YANINEE.

December 1st.—Present: 19 members and one visitor.

Grading Seed Wheat.—A member contributed a short paper on the grading of seed wheat. Every farmer should grade all seed wheat before sowing it, he said, because grading removed cracked and small grains from the seed, and the land on the farm would be kept much cleaner if that practice were adopted. Further, the seed could be sown more evenly because it would be of uniform size. The crops from such grain would have a more even growth, and would be more economical to harvest. The speaker maintained that it would pay any farmer who had more than 50 acres to reap to purchase a grading machine. He thought that where two or three farmers were within reasonable distance of one another it would be a good plan for them to co-operate in the purchase of a grading machine.

YEELANNA.

December 1st.—Present: 15 members and three visitors.

SCRUB-ROLLING.—In the course of a short paper dealing with this subject Mr. W. Wemyss said that having used both a scrub roller fitted with angle iron and a bow-shaped log shod with ¾in. iron under the same conditions, he was convinced that the log was the more effective, both as regards quality and speed. In yoking the horses to the log he had found that better results were obtained if the horses were coupled at a distance of about 6ft. from the log. That would allow the log to drag instead of lifting, and also to grip the scrub and pull it off much better. In discussing the paper the majority of members spoke in favor of the log.

COLTON, December 8th.—Members discussed matters relating to the Wheat Harvest Board.

KOPPIO, November 26th.—The monthly meeting of the Branch took the form of a tour of inspection, when members visited the farms of Messrs. Richardson, Price, and Newell.

WARROW, December 22nd.—A discussion took place on the shoeing of horses.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

November 26th.—Present: eight members and one visitor.

FARM DWELLINGS.—The care and maintenance of the farm dwellings were dealt with in a paper contributed by Mr. G. R. Small, in the course of which he mentioned the wisdom of painting the house, not only on account of the improvement effected in the appearance, but also because of the extra protection which it afforded, especially in the case of the galvanized iron structures. On the question of the size of the rooms, he expressed the opinion that they should be not less than 15ft. square, 12ft. high, and well ventilated. The bedrooms could be made slightly smaller. The kitchen should be on the south-eastern corner of the house, and the walls and ceilings whitened. In many cases the outside of the houses were not painted, and he thought the appearance of the farm would be greatly improved if that were done. He also spoke of the need for improvement in the men's quarters.

POULTRY IN MALLEE COUNTRY.—A member contributed a paper under this heading, and in the course of his remarks, said one pleasing feature in his experience with poultry in that district was that the climate and soil were peculiarly adapted to the raising of all kinds of poultry. The only disadvantage in regard to the soil was the lack of lime and ironstone. For profitable poultry keeping it was necessary to have cat-proof yards for the chickens and fox-proof yards for the older birds. "The yards need not be elaborate," the paper continued. "In the first place a yard is required large enough to accommodate the fowls when they are fed. This should be constructed of wire netting about 6ft. 6in. high. A yard 40ft. x 60ft. will accommodate 300 laying hens. A good quantity of old straw or chaff, say, from the hay yard, should be kept in the yard for the hens to scratch in. The grain should be thrown in this litter, and all trees removed from the yard, otherwise the birds will be trained to climb and fly to great heights, and difficulty will be experienced in keeping them in the yard. The house may be constructed of any available material. Of course, to make sure that there will be no trouble with lice and tick, galvanized iron is the best material to use, but the present price almost puts it out of consideration. From my experience I can safely recommend stumps for the walls and straw for the roof of the house if no better material is available, provided that a sandy site is selected to build on. The house may be open to the east, and placed so as to abut on to the yard. If the house is placed in the yard it will be found that the fowls will prefer to perch on the shed instead of roosting in it. Care must be taken to see that foxes do not gain admission to the yard, by coming over the roof of the shed. A run of wire netting placed around the top of the shed will prevent this. A shed 21ft. x 16 ft. will accommodate about 300 fowls if they are allowed to run at large during the day. The main poultry yard and chicken runs should be conveniently situated to one another, and all the chickens reared there and drafted into the main yard when they are old enough to look after themselves. If this is done, and the fowls fed night and morning in the scratching yard, there will be no difficulty in getting the poultry into the yard at night, for the old maxim, 'Chickens come home to roost,' still holds good. Being called into the yard they can be safely shut in for the night. It will be found that most of the laying will be done in and around the fowlhouse. It will be seen that I advocate a method between that pursued by the up-to-date, scientific poultry man and the old haphazard way that did service 40 years ago. If fowls are kept in a yard continually they require a lot of care and attention; generally more than a busy mallee farmer can bestow on them. But if they are allowed their freedom during the day they will forage for themselves and pick up the necessary green feed during the winter and spring months. One hundred to 150 fowls can get the most of their living around the stack yards without doing a great deal of damage to the stacks, and if they are trained to return to their yard at night they can be easily handled and will give no trouble in the way of sleeping where they are not wanted. The question, 'Which is the best breed of fowls for the farmer in this district?' is a debatable one. Is the White Leghorn more profitable than one of the heavy breeds? Turning to the report of the Parafield egg-laying competition for 1913-14, which is the latest I can conveniently place my hand on, I find that the average per hen for 125 pens of White Leghorns, containing 750 birds, was 184.4 eggs; 14 pens, containing 84 birds of the Back Orpington variety, produced an average per hen of 154.66 eggs. One pen of White Wyandottes containing six birds averaged 181.5, or only three eggs less than the average of the White Leghorn variety. But we have to remember that there was only one pen of White Wyandottes against 125 pens of White Leghorns. The Black Orpington is a favorite breed with many farmers, and the average per hen of that breed works out at about 29 eggs below the average of the White Leghorn variety, and will represent in a general way the difference between the egg-producing capacity of the latter breed and all the heavier breeds of poultry. Individual hens of the heavier breeds naturally take more food to maintain their extra size. Taking three years as the best egg-producing period of a hen's life, it will be seen that the large hen has cost more to keep, and in that time has produced less eggs by seven dozen than her smaller rival. Taking the average price of eggs at 10d. per dozen the difference in favor of the smaller breed is 5s. 10d. in three years. When the hens are sent to market the difference in favor of the larger bird will probably be about 1s. Judging, therefore, by the Parafield test, the most profitable bird for the farmer to keep is the pure bred White Leghorn. In my own case, I started with a pure-bred pen of the popular laying breed, and bred from that pen for several years, using cockerels from reliable breeders when a change was necessary. But, not being altogether satisfied with the egg production of the flock last year, I made a change, and used White Orpington and Silver Wyandotte cockerels with the White Leghorn hens. The result was a good, plump class of hen, which takes more feed than the smaller bird. A slightly better layer than the pure-bred White Leghorn during the earlier months of winter, but an inveterate sitter. The White Leghorn usually gives about 10 per cent. of sitters; that is about 20 broody hens towards the end of the spring and beginning of the summer months out of a flock of 200. But every crossbred fowl in my yard now seems to have a turn at the game. When a fowl lays a few eggs and then takes the broody fever you may be sure she is not putting up a big score as an egg producer. Of course to decide the question of the best fowl for the district it is necessary to test the capacity of each breed under the same conditions. In that way only can the question be decided. But so far as my experience goes, the pure-bred White Leghorn is the most profitable breed. The flock may be started in various ways. One can select 10 or 12 of his best hens, and get a pure-bred cockerel of the breed he favors from a reliable poultry breeder, and keep them in a yard. A pen of this description will produce sufficient eggs in the spring months to raise about 300 chickens. Or he may procure the whole pen from an up-to-date poultry yard. This, of course, will be expensive, but if the poultry is properly handled it will be a profitable venture. It pays to give a good price for a cockerel from a breeder of a first-class strain of laying fowls. Say the bird costs 30s. He will last for three years if properly looked after, and if mated with 10 or 12 good laying hens will be capable of producing 300 good healthy chickens each season. Out of this lot one can expect to have at least 120 pullets. These pullets will be worth from 1s. to 2s. per head more than pullets bred from a mongrel bird. But if they are only worth twopence each more than the stock of the mongrel, it will show a good profit on the investment. The principal food for poultry is good clean wheat. Oats also can be used with advantage. I find the fowls are very partial to soaked oats. In the poultry yard there is a good market for the farmer's surplus oats. Fowls will do all right on a grain diet if they have the opportunity to run at large, but if they are confined in a yard, then they need bran and pollard mash for their morning meal with 1lb. of meat meal added for every 100 fowls. Where there is an absence of lime or ironstone rubble it pays to purchase shellgrit and keep a supply before the hens. The supply of plenty of good clean water must not be overlooked, likewise that of green feed, especially in the summer months. In regard to disease in poultry my principal loss has been through the hens becoming crop bound. This year I had trouble with roup. Experts say that the best remedy for this vile infectious disease is the axe. But I have found, if the disease is taken in time it will yield to a few doses of eucalyptus. Two or three drops on a little piece of bread three times per day for a few days will effect a cure. If, however, the disease has a strong hold of the bird, then the axe should be used. If the disease is suspected in the flock, bran and pollard mash containing a fairly strong dose of eucalyptus should be given every day. Hens should only be kept for egg production for three seasons. To facilitate the selection of the aged birds for market the pullets should be toe-marked. An instrument for this purpose can be obtained for about 3s.; or an ordinary revolving leather punch may be used. By this simple method of marking, it is a very easy matter to cull the old hens out of a flock.''

McNAMARA BORE.

December 2nd.

The monthly meeting of the Branch was held at the residence of the Chairman (Mr. F. G. Williams), who read an interesting paper on ''Co-operation.'' Mr. Williams, in the course of his remarks, pointed out the success that had followed the formation of producers' co-operative societies in various parts of the world. He dealt with the many disadvantages under which the producer was laboring, both as a purchaser and a seller. It was useless, he said, for the primary producer to say that present conditions were good enough; he must either combine or help to fill the pockets of those who were combined.

ROSY PINE.

November 28th.—Present: 17 members and four visitors.

Care of Horses' Shoulders.—Mr. Lucier, in reading a paper dealing with this question, said great care should be taken to keep the horses' shoulders free from sores. A new collar if soaked in water for one hour before it was used would be more likely to fit. He preferred the use of pointed wagon hames, because one could alter the draft. Colts were very liable to scald their shoulders when first being broken in. Much would be done to prevent it if the colt's shoulders were thoroughly washed with clean cold water as soon as the collar was removed. Good grooming was essential if one wished to keep the shoulders free of sores, and the collars should be brushed and cleaned each morning before they were put on the horses. Relief could be given to a horse working with a sore shoulder by making a cut on the back of the collar and removing a little of the stuffing. If the shoulder was very tender and the horse inclined to be fractious, some soothing ointment could then be rubbed on the lining of the collar. A false collar could also be used to advantage in such cases. Very often sore shoulders were caused by impure blood; but if a packet of Epsom salts had been dissolved and sprinkled over each horse's feed once a week, much would have been done to obviate future trouble. He was of the opinion that many sore shoulders were caused by allowing the horses to drink when leaving the stable to go to work. That plan caused the horses to sweat profusely for the first hour or so of their work, and as the day advanced the sweat dried on the shoulders. In concluding, he advised that the following points be adopted:—Each horse to work in its own collar; traces or chains should be of equal length; in working teams abreast, the couplings should be so adjusted that each horse pulled square on to his work. Mr. Schiller, in discussing the paper, thought the chief cause of sore shoulders was the jar of the stumps. He had tried every kind of collar in vogue, but still some of the horses had sores. Another cause of sore shoulders was having too heavy a set of swings, as the constant swaying of them jarred the horse's shoulders. He found that working a slide on the plough swings eased the horses considerably. Mr. Docking had a piece of timber projecting over the front of the plough and fastened to the swings, which prevented the swings from swaying. Mr. Hay thought if horses were kept in good condition there would not be much trouble with sore shoulders. Mr. Jones thought much of the trouble was due to carelessness. After horses had been worked for some time the shoulders fell away more than any other part of the body, and the collar should be taken up a little. Mr. Ledger said the points to be observed were keeping the horses in good condition, and plenty of strength on the implements.

WAIKERIE (Average annual rainfall, 8.89in.).

December 21st.—Present: 10 members.

Drying the Apricot.—Mr. Lehmann, in a paper under this heading said the first essential in securing a good dried article was the careful picking and handling of the fruit. The picking should, if possible, always be done in the cool hours of the early morning, and the fruit placed in the shed where the cutting was to be done. An inexpensive cool shed could be constructed from brush and straw. It was very necessary that the fruit should be clean and evenly cut and placed on the trays preparatory to sulphuring. When sufficient trays were filled they should be placed in the sulphur box as expeditiously as possible and not allowed to dry. Apricots would always sulphur better and retain their color when put in the sulphur box fresh. About 2lbs. of sulphur would be sufficient to do 50 to 60 trays. The time taken in the sulphuring operation was determined by the state of the weather, the hotter the day the less time required. In good weather about four hours was sufficient. When sufficient trays were available it was preferable to stack dry; the fruit would dry heavier, and a better color would result. No definite time could be fixed for the drying process, as it was entirely dependent upon the prevailing weather conditions.

BERRI, November 27th.—The Poultry Expert (Mr. D. F. Laurie) gave an address on "Poultry Breeding and Feeding."

BERRI, December 12th.—The Viticultural Instructor (Mr. H. E. Laffer) delivered an address dealing with anthracnose of the vine.

MONARTO SOUTH, December 1st.—Mr. A. Forbes read an extract from the *Journal* on "The Breeding and Fattening of Lambs."

WAIKERIE, November 30th.—The election of officers for the ensuing 12 months took place, after which members discussed the subject of "Fungoid Diseases."

SOUTH AND HILLS DISTRICT.

BLACKHEATH.

November 23rd.—Present: 11 members and four visitors.

Question Box.—The programme for the evening took the form of a question box, and in reply to a question Mr. J. Pym stated that one acre of lucerne would cost about £4 to sow, and when properly established he would value it at £50 per acre. Mr. Pym exhibited some fine samples of lucerne. The first cut was 4ft. 5in. high, the second 3ft. 3in., and the third 2ft. Mr. R. Talbot asked if large potatoes would yield a better crop if they were cut. Members were of the opinion that they would. Mr. J. Strauss asked what members considered the best sideline on the farm. Members spoke unanimously in favor of sheep.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

November 27th.—Present: 15 members.

Home Storing of Apples.—In a paper dealing with this question, Mr. S. W. Chapman said one of the main essentials for the successful storing of fruit was that great care should be exercised when gathering the fruit and conveying it from the garden to the storehouse. Another important point was that the fruit should be fully matured, otherwise it had a tendency to shrivel. The storeroom should be roomy and well ventilated, but free from draughts. He had tried several methods of storing apples. If shallow shelves were used they should be placed one above the other 4ft. wide, and 9in. apart, and the fruit placed on them two or three deep, according to size. Good results would be obtained from that method, but owing to the space required and the amount of handling in placing them on the shelves and the inconvenience when repacking for marketing, that plan would not commend itself as being suitable for handling any large quantity of fruit. Deep shelves could be made the same width as the former, but about 2ft. apart, the fruit placed in them to a depth of about 18in. If the shelves were first covered with soft padding, such as straw, dry grass, or wood wool, the greater quantity of the fruit could be emptied from the cases if ordinary care was taken, and the extra room between the shelves would be found a great convenience when the fruit was being repacked. Wire netting shelves had at times given fair results, but were not to be recommended if suitable timber was available for shelves. The netting naturally sagged, thereby subjecting the fruit in the centre to undue pressure. The netting, if used, should have a good covering of padding. The use of banana crates was favored by many growers, because the fruit could be easily and conveniently handled, and at the same time they would give good results.

KANMANTOO (Average annual rainfall 17.90in.).

November 24th.—Present: nine members and one visitor.

Sheep Tick.—The question of the loss due to the infestation of sheep with tick was referred to in a paper by Mr. A. W. Hay. He mentioned the case of a line of 700 wethers. Six hundred of those were dipped in November last year; 300 of the dipped sheep were kept from contact with the infested animals, but the other 300 were depastured with the undipped 100. The 300 first mentioned this year yielded a clip of seven bales A fleece, three bales second fleeces, with only a few cast fleeces, and the wool was in beautiful condition and quite free from tick. The other 300 sheep, amongst which 100 sheep that had not been dipped were put, were infested with tick, and cut two bales of A fleeces, five bales of seconds, and two bales of cast fleeces. He was of the opinion that an inspector should be appointed to supervise each district, and to prevent sheep from being sold until they were dipped. During the last two years there had been a great increase in the number of tick-infested sheep in that district, and he thought the whole trouble was caused by a few careless farmers and sheep travelling from the South-East.

MILANG.

The Care and Management of Dairy Produce.—Mr. J. Morcomb, who contributed a paper on the above-mentioned subject, said the first and most necessary feature in the care of dairy produce was strict cleanliness in all matters connected with the dairy. The hands of the milker should be kept clean, and if a pail of water and a cloth were kept handy at milking time it would only take a few seconds to rinse the hands after each cow was milked. He was not an advocate of the dry system of milking, but considered the hands should be kept slightly moistened. Another good plan was to wipe the cow's udder and teats with a damp cloth before being milked. If that plan was adopted the teats would be damp enough to enable one to work with clean hands. Secondly he pointed out that all utensils such as buckets, strainers, separators, cream cans, &c., should be kept thoroughly clean. He favored the use of wire strainers because they were easily kept clean. If the separator was not washed out after each working, but allowed to remain overnight uncleaned, there would be sufficient development of germ life to badly contaminate the cream and render it in such a condition as to make the production of first class butter impossible. The cream cans should also be washed with limewater, and allowed to stand in the open air, where they would be under the direct rays of the sun. Old cans from which the tin has worn should be discarded, because the cream coming in contact with the rusty iron would very soon become tainted. After the cream had been separated it should be cooled down at once. That could be done by standing the can in a tub of cold water, and occasionally stirring it, in order that the temperature might be reduced as quickly as possible. There were some farmers who not only failed to stir their cream, but allowed the cream separated from the morning's milking to run on to that in the can into which the evening's milk had been separated. That meant that the warm cream coming from the separator would be mixed to a certain extent with the cool cream in the can, thereby increasing the temperature of the cream which had already become cold. It should always be borne in mind that any increase in temperature would bring about a too rapid ripening of the cream. Each lot of cream separated should be kept in a special vessel until thoroughly cooled down, when they could be mixed and stirred, and in that way a uniformly blended cream was delivered to the factory. If the farmer wished to dispatch the morning's cream to the factory shortly after it had been separated it was advisable to keep it in a separate can while being carried to the factory, otherwise it was very liable to arrive in a somewhat churned condition. Not only would the farmer lose a certain amount of butter fat, the butter-maker would also find great difficulty in making a nice clear butter. It was a good plan in the summer time to put a wet bag over the can while in transit to the factory, provided the bag was clean, and that the water did not get into the cream through the lid of the can. In conclusion, the speaker mentioned the need for having a good supply of fresh, clean water easily available for the cows.

MOUNT BARKER (Average annual rainfall, 30.93in.).

September 26th.—Present: 47 members and two visitors.

POTATOES AND THEIR DISEASES.—A paper under this heading was read by Mr. J. Pope. He first directed attention to early blight, although that disease was seldom noticed in Snowflakes. He had seen it in early variety potatoes. The tops died down, but the tubers were small and sound. In some districts scab was very troublesome, and Pinkeyes were very subject to that disease. Crops from land that had been continuously growing potatoes, heavily manured with farmyard manure, or rich heavy land, were more subject to scab than those from lighter soils and land that had been worked with a rotation of crops. Potatoes in land that had been limed, he said, were more likely to be affected with that disease, although in other ways liming might be beneficial. Wet rot in potatoes was of bacterial origin, and it only needed certain conditions to start the fungus. He was of the opinion that it was not wise to plant quite so deep, and the potato should be well earthed up in order to drain excessive moisture between the rows and below the tubers. If the soil was wet it was a good plan to dig the potatoes as soon as they were fit. The development of Irish blight was encouraged by the presence of excessive moisture. Its first appearance was on the stalks, and later in the tubers. A preventive that could be adopted, and one that would be attended by a fair amount of success, was to plant in rows up and down the hillside on light, well drained soil, using the machine, hill the potatoes up well, and use only sound and disinfected seed. If the seed was subject to a heat of from 105deg. to 110deg. for a few days it would destroy the fungus and not injure the seed. One of the best means of overcoming pests and diseases was to institute a rotation of crops, and for that purpose he would recommend either peas or rape sown every three or four years. An animated discussion followed the reading of the paper. Replying to questions, Mr. Pope said he felt satisfied that it was Irish blight that had affected the potatoes in the Mount Barker district during the past season. It developed in the form of dry rot, which had a most offensive smell. Irish blight appeared to come when it was least suspected. Last year he had planted some seed imported from Victoria. It was passed by two sets of inspectors, who made a most thorough examination of the bags, but that did not prevent the tubers which grew from the seed developing the blight in a most virulent form. Mr. E. F. Stevens believed the season had a good deal to do with the development of Irish blight, and that the seed itself was not primarily to blame. He had sown potatoes on land on which a similar crop had rotted completely out the previous year, and the resulting yield had been completely free from any trace of the disease. Mr. Pope was convinced that climatic influences had a great deal to do with the development of Irish blight. It was also true that certain varieties of potatoes were more susceptible than others. For instance, Carmens were particularly subject to it, whereas Snowflakes were practically immune. Mr. W. E. Daddow believed proper ventilation would act as a deterrent in preventing the development of the disease where the potatoes were in stack. Mr. Fleming advocated a formalin dip as a preventive of Irish blight, while Mr. H. Jones thought a crop of mustard, ploughed in while green, would have a beneficial effect.

MOUNT BARKER (Average annual rainfall, 30.93in.).

October 24th.—Present: 48 members and two visitors.

The Past and the Present.—Mr. J. Brinkley contributed a paper, in the course of which he contrasted the conditions existing at the time of the earlier settlement of the agricultural lands with the conditions prevailing at the present. He paid a tribute to the indomitable perseverance and hope that characterised the pioneers, who, with little but their fine strength and courage, went out to win a living from the soil. He referred to the building of the homesteads, the clearing and cultivation of the land, and the harvesting of the crop with the sickle. "Men and women worked early and late to get their small beginnings successfully harvested," he continued, "the men reaping half an acre, and some one acre per day, at from 10s. to 14s. an acre." Thrashing was done with the flail, and to clean 20 bags a day involved patient work. From 35bush. to 40bush. per acre was the yield, and the price ranged up to 12s. 9d. per bush. Dealing with the present day conditions, he said:—"The farmer of to-day, as I have met him, is a grand fellow. He has no hesitation in telling you that no one ever grew so many bushels to the acre as he does. He speaks with contempt of the old farming method, and at the same time he brags about the miracles his grandfather and father performed. He has no old-fashioned notions. If he reads of a new implement that does wonders he will have one, if only just to gratify his will power. In these days there is an inclination amongst farmers' sons to forsake the soil and take to engineering, surveying, or some easy trade. You may ask the young man of to-day what he intends to do; in many cases he will reply, 'I want an easy job.'" (Laughter.) "These are not the men that will keep Australia up to the required standard. We want men who will use the spade, wield the axe, follow the plough, swing the scythe, milk cows, feed pigs, and attend to stock generally. At the present time a man has everything in his favor. If he wishes to go for farming, dairying, gardening, bees, pigs, or poultry, he can secure all the necessary information by consulting practical men on these respective subjects. I think he will be able to pick up valuable hints by being a member of the Agricultural Bureau. Men get weary of hearing local men, and they do not attend the meetings. But they turn up readily enough when a man of some importance comes along; they are not consistent in regard to their own welfare. The man on the land to-day must produce the very best sample, whether it be wheat, hay, chaff, oats, barley, or potatoes; the produce must be A1, or the seller finds he has some difficulty in securing a sale. Good stuff requires no recommendation. The up-to-date farmer should keep a diary. He can then ascertain if it is possible to carry on farming pursuits, or if it will be necessary for an overdraft to carry on the coming year's operation. I think the producers have to thank the Government for the assistance they have rendered in the way of experiments. They have spent money freely for no immediate results, but because they appreciate to the full the advantage of scientific research. I know scientific knowledge is treated by some men with a contemptuous spirit, and is called 'a money loser', yet I am convinced it is on the right track, for in farming, as in scientific engineering, the trained man is certain to win. At the present time the Agricultural Department is doing the most useful work in the world. The weather prophets publish every day the weather charts, to the advantage of the farmers, and forecasting has risen by the hand of science. In the animal industry the Government expert is ever busy watching exports or imports of the animal that may carry some unwelcome disease. Then, we have the eye of science investigating diseases in fruit, potatoes, and other things; it has been successful in reducing diseases, and in some cases has stamped them out. The man who says he can manage without science will find out his mistake later on.''

PORT ELLIOT (Average annual rainfall, 20.33in.).

November 7th.—Present: eight members.

Wattle Bark Culture.—Under this heading a paper was contributed by Mr. W. W. Hargreaves. There were many species of the wattle growing in South Australia, he said, but the one of most interest to growers was the *Acacia Pycnantha*, or broad leaf wattle, which grew so readily in the Adelaide Hills. The cultivation of wattles was simple, and as the trees would grow on poor soil, the capital required to take up land for their cultivation would not be very large. If entirely fresh cultivation had to be commenced, then a period of six years would have to elapse before the oldest trees were ready for stripping. The trees should not be stripped until the bark had reached a maximum thickness. The condition of the bark at the base of the trees indicated, by its darkening and flaking off, that the trees had reached that stage at which they could be stripped to the best advantage. If the trees were under such conditions that they were growing in what was termed ''whip stick'' order, systematic thinning out should be pursued. The dry climatic conditions that prevailed in many of the districts in which wattle trees were cultivated made it essential that every possible precaution should be taken to guard against an outbreak of fire. On many occasions a great deal of damage had been done to the wattlebark industry by fires in the Adelaide Hills. All useless residue from the trees, after they had been stripped, should be burned, and where wattle trees were grown to any great extent, fire-breaks should be set up and every opportunity taken to minimise the danger. The bark, after it had been stripped, should be allowed to lie on the ground for a couple of days to allow it to ''cure.'' When dry it should be tied with bark twine into bundles of a size that would run about 40 to the ton. The practice of making large bundles should be avoided, because that did not allow the bark to dry, and on account of being extra heavy a considerable loss would arise ere such bundles reached the grinding mills. The fact that any loss of weight in transit rested on the producer should be borne in mind. In the stripping process the wattles should be cut close to the ground, and the old order of things, whereby the trunk of the wattle was cut on an angle some 4ft. from the ground, and left to set up the risk of staking a horse should be abolished. The paper then dealt with the economic and commercial aspects of the tanning business.

URAIDLA AND SUMMERTOWN.

On page 442 of the December, 1917, issue, Mr. Cobbledick is reported to have advised the use of 25 tons of bonedust to the acre. This should have read ''25cwts. per acre.''—Ed.

BLACKWOOD, November 19th.—Professor T. G. B. Osborn, M.Sc. (Professor of Botany, University of Adelaide) delivered an address on ''The Principles of Disease and Control.''

CLARENDON, December 19th.—Mr. V. J. Spencer read a paper dealing with ''Dairy Cows.'' Mr. J. Spencer informed members that potatoes that were reported to be showing signs of Irish blight had been dusted with slaked lime, which had checked the development of the disease.

CYGNET RIVER, November 1st.—ANNUAL MEETING.—The annual meeting of the Branch was held at Mr. H. T. Noske's residence, when the Hon. Secretary (Mr. C. T. Miller) read the annual report, which showed that the Branch had held 11 meetings during the past year, with an average attendance of eight members. After the election of officers the members inspected various crops on the homestead.

INMAN VALLEY, November 30th.—Mr. G. McCoy read a paper dealing with the various methods employed for the clearing of timber and undergrowth prior to cultivation. He advocated the use of explosives in order that logs might be more easily used for fencing purposes.

LENSWOOD AND FOREST RANGE, November 29th.—The meeting discussed the question of the proposed cool stores to be erected at the market.

MACGILLIVRAY, November 27th.—The monthly meeting of the Branch was held at Mr. H. J. Nicholl's residence. Mr. Inglis read a paper from the *Journal of Agriculture* on "Potato Culture."

SOUTH-EAST DISTRICT.

KONGORONG.

November 27th.—Present: 11 members and four visitors.

FARM BUILDINGS.—Under this heading a short paper was contributed by Mr. C. T. Aitken. He was of the opinion that the most suitable materials for the erection of farm buildings in the surrounding districts were stone and iron. He did not think it would be necessary to employ skilled labor. The work would possibly seem rather awkward at first, but with a little practice one would soon be able to erect good, serviceable sheds. The most convenient site to erect the buildings was as near the centre of the holding as possible. It was a good plan to have the outbuildings adjoining one another, because one would save much labor in building the walls. The first shed would require four walls, the next three, and possibly the last only two. Less protection was also needed if those sheds were built together. Mr. E. E. Morrison, in discussing the paper, said it was not always suitable to build in the middle of the farm, but the best site should be chosen for the house.

NARACOORTE (Average annual rainfall, 22.60in.).

November 10th.—Present: 25 members.

MACHINE SHEARING.—A paper on this subject was contributed by Mr. A. B. Feuerheerdt, who said machine shearing had been introduced into Australia nearly 30 years ago. At the present four-fifths of the sheep in Australia were still being shorn by machines, which proved conclusively that that method was the best, and machine shearing had come to stay. Since they were first introduced the machines had been greatly improved, and had now become perfect wool-cutters, and with good men handling them did perfect work with all classes of sheep. Of course, the machine in the hands of a careless or inexperienced man would do wretched work, but the same thing applied to the blade shearer. It was something like 12 years ago since they first installed the machines at Crower. The machines were still going strong, and some who had condemned them most had fallen into line and adopted them themselves. The art of machine shearing was quickly acquired, and he had seen a man who had never shorn a sheep in his life come on the board and do 100 before the shed was cut out, and had seen a man shear over 200 faultlessly. During that season 12 men put up an average of 170, turning out 2,040 sheep, principally Merino wethers, in the eight hours' run. A man could not shear too fast, providing he was shearing well. The general opinion when machine shearing was first introduced was that the sheep would never cut the same amount of wool again. When the next shearing came along and the sheep came in as usual, the belief was, after two shearings, there would be a falling off. When that was proved incorrect, it was the third year; and after that the sheep still showed no sign of deteriorating. Instead of deteriorating the wool it stimulated it. Another exploded theory was that the machines felted the wool near the skin, but as they had had no complaints from the buyers or manufacturers that was sufficient proof as to the fallacy of that belief. One drawback to the machines in hot dry districts was the danger of sun scald; for where a sheep was scalded the wool would never appear again, and for that reason, where it was possible to do so, sheep should be shorn into a sheltered or shady paddock. Here in the South-East it was a sudden cold change which might affect them, and for that reason there was nothing better than a scrub paddock to shear into. He had only known of one instance in the South-East of losses due to cold, and in that case something like 60 sheep died, but they were very low in condition at that time, and had been in the yards for something like 48 hours. Stud sheep were mostly hand shorn, not with the idea that the machines might injure them, but principally that individual records must be taken, weight of fleeces, etc., and also to place them on the same level with other blade-shorn sheep when they competed at shows or were exhibited for sale. A machine shearing plant was easily erected, and in some parts of New South Wales and Queensland, the shed and plant were taken to the paddock where the sheep were running. For a small flockmaster a two-stand plant could be bought for about £70, engine and all, but where an engine was already on the place the price would be considerably less, and would cost about £15 per stand. The engine, of course, was not a fixture, and should be used for driving the chaffcutter, cutting the wood, &c. There was no question that machinery was faster than blades, and the sheep did not deteriorate. In conclusion, he pointed out the necessity for thoroughly classing the wool, no matter how small the clip, for with the present system of appraisement, there was no competition in the buying, and the bale, or even the bag of wool, was valued by its contents the same as a 100-bale line. A lengthy discussion followed, in the course of which some members expressed a preference for blade shearing.

SANDALWOOD.

December 1st.—Present: 13 members and two visitors.

Care of Farm Machinery.—Mr. J. R. Kealy, in a paper under this heading recommended that a high shed with a well-thatched roof should be erected for the farm machinery. It should be seen that each implement was well oiled and in good order before commencing work, he said. The nuts and bolts on all new implements very soon worked loose, and one needed to be constantly on the lookout or they would probably be lost. When the machine had finished work for the season it should be cleaned and stored away ready for next year. It was a good plan to give the woodwork of the implements a coat of paint. In some machinery great care should be taken in driving the horses and in turning. It was often noticed that a man driving a cultivator would try and turn at right angles. That in time would wrench the machine to pieces.

THE CEREAL HARVEST OF 1917.

Speaking generally it may now be affirmed that the grain crops are harvested in all the important producing countries of the northern hemisphere, and the time has arrived for summing up the various official estimates of yield so far furnished by the Governments, in order to ascertain whether the harvests of this year have been good, average, or poor, dealing with each product separately. This is done by the *Bulletin of Agricultural and Commercial Statistics*, published by the International Institute of Agriculture of Rome. The September number, just issued, furnishes a definite reply to the query, as regards all the cereals both for food and fodder, and we proceed to summarise the international tables therein. For wheat, the Institute has ascertained the yield of the following countries:—Spain, France, Scotland, Ireland, Switzerland, Canada, United States, British India, Japan, Algeria. These countries have produced in the aggregate 453,268 thousand quintals, while in 1916 the total was no more than 438,705. The crop of 1917 therefore represents 103.3 of that of 1916; but, if compared with the average of the five years 1911 to 1915, we find the yield of the present year to be only 88.6 per cent. of this average. It is therefore the case that the crop of 1917 is decidedly better than that of 1916, but this fact does not cancel its appreciable inferiority to an average yield.

With respect to rye, the total yield of Spain, Ireland, Switzerland, Canada, and the United States is 22,848 thousands of quintals, or 110.7, and 126.8 per cent. of the yield of 1916 and of the average, respectively. The position with regard to this cereal is quiet satisfactory, but the area cultivated is relatively a small one. The facts as to oats are very favorable, the yield in 1917 being estimated at 289,644 thousands of quintals as an aggregate for Spain, Switzerland, Canada, and the United States. The respective percentages are 119.9 per cent. and 118.1 per cent. The maize crop also affords a parallel, Spain, Switzerland, and the United States yielding 831,626 thousands of quintals, or 125.3 per cent. and 117.7 per cent., as compared respectively with the crops of 1916 and 1911 to 1915. The plentiful maize harvest of 1917 is all the more important since this grain is cultivated so widely, and at present fulfils a considerable role in the provision of human food. As to barley, the total yield of the following countries—Spain, Scotland, Ireland, Switzerland, Canada, United States, Japan, Algeria—is 101,086 thousands of quintals, representing respective percentages of 102.4 per cent. and 98,4 per cent. The position of this cereal is therefore an average one.

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Monthly Notes in *The Journal of Agriculture;* subscription 1s. per annum, posted; 2s. 6d. Inter-State.

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Inspection is invited of Stock and Methods Adopted.

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ADELAIDE.

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CROWN LANDS.

AUCTION SALE,

At the Land Office, Adelaide, Thursday, January 17th, 1918, at 11 o'clock a.m.

Allotments in towns of Berri, Cadnia, Cadnia East, Ceduna South, Iron Knob, Kimba, Noora, Snowtown, and Yatina.

Leases of Mootra Reservoir, hundred of Cortlinye; Cox's Reservoir, near Waukaringa; Nantowarpunna Reservoir, near Marree; and water reserve No. 120, near Lake Harry Bore.

Sale of lessees' interests in section 84, hundred of Boothby, and section 1, hundred of Keith.

Full particulars are published in the *Government Gazette.*

APPLICATIONS FOR LAND.

Intending applicants for any lands which are open are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portion of a block, if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey.

ALLOTMENTS, SALES, TRANSFERS, SUBLEASES, AND MORTGAGES.

Notice is hereby given that in future no applications for land, or for transfer, sublease, or mortgage of Crown leases or agreements will be approved to unnaturalised persons of *any* nationality, or to naturalised persons of enemy origin unless the consent of the Honorable the Attorney-General of the Commonwealth be first obtained by the parties making the application.

Where any doubt as to nationality exists, it will be necessary for certificate of birth or naturalisation papers to be exhibited.

The same principle will apply to land sold by auction.

OFFICIAL LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open which may be seen at the principal Post Offices, and copies obtained at the Office of the Secretary for Lands. The List shows the Areas, Localities, Prices, &c., of the Sections availabl and the conditions under which they may be applied for.

NOTICE TO APPLICANTS FOR LAND.

The Land Board meets daily (when necessary) at the Board's Office, Department of Lands to deal with applications received the previous day for any lands that may be open in th Official List. Applicants must either attend personally or send a full written statemen Forms can be obtained at Post Offices, or on application to the Secretary for Lands.

HARRY JACKSON,

Commissioner of Crown Lands and Immigration.

AGRICULTURAL COLLEGE, ROSEWORTHY.

The seed grains submitted for sale this season comprise a number of early, mid-season, and late wheats and barleys, a mid-season variety of oats, and a small quantity of field pease. The cereals have all been selected from pure strains and well graded. The production of selected and graded seed has been continued at the College for over 12 years, and hence most of the strains now being offered possess unbroken pedigrees of considerable length.

CATALOGUE AND PRICE LIST OF SEED GRAINS AVAILABLE FOR 1918 SEEDING.

Orders will now be booked for any of the undermentioned varieties, and applications will be dealt with as far as possible in the order in which they are received. The prices quoted are "on truck, Roseworthy," and are subject to revision. All orders and inquiries should be addressed to—

THE PRINCIPAL,
Agricultural College, Roseworthy.

GRADED PEDIGREED SEED WHEATS.

EARLY VARIETIES.

King's White	Selection 9	5/-	per bushel
King's White	" 10	5/6	" "
King's Red	" 10	5/6	" "
Caliph	" 1	5/-	" "
Gluyas	" 9	5/-	" "
Gluyas	" 10	5/6	" "
Late Gluyas	" 9	5/-	" "
College Eclipse	" 9	5/-	" "

MID-SEASON VARIETIES.

Daphne	Selection 4	5/6	per bushel
Federation	" 8	5/6	" "
Queen Fan	" 6	5/-	" "
Queen Fan	" 7	5/6	" "
Anvil	" 4	5/6	" "

LATE VARIETIES.

Canaan	Selection 4	5/6	per bushel
Marshall's No. 3 B	" 8	5/6	" "
Yandilla King	" 4	5/6	" "

GRADED AND PEDIGREED SEED BARLEYS.

EARLY VARIETIES.

Tunis 1	Selection 1	4/6	per bushel
Tunis 2	" 1	4/6	" "
Tunis 3	" 1	4/6	" "

MID-SEASON VARIETIES.

Tunis 4	Selection 1	4/6	per bushel
Tunis 5	" 1	4/6	" "
Roseworthy Oregon	" 9	4/6	" "
Roseworthy Shorthead	" 10	4/6	" "

LATE VARIETIES.

Tunis 6	Selection 1	4/6	per bushel

OATS AND PEASE.

Oats—Algerian Tartars	4/-	per bushel
Pease—Early Dun	6/-	" "

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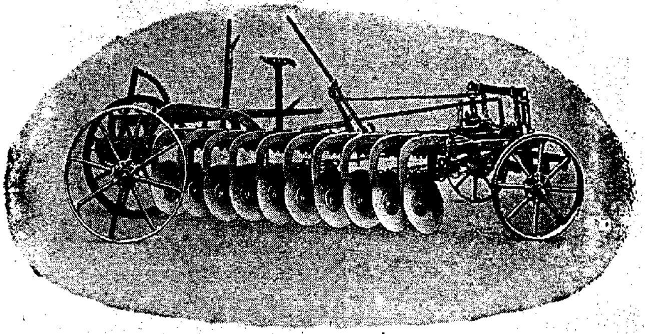

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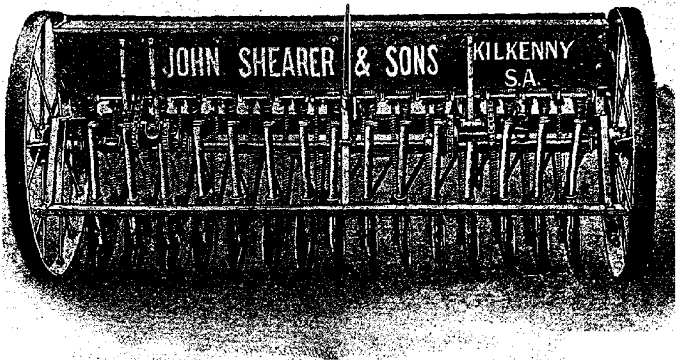

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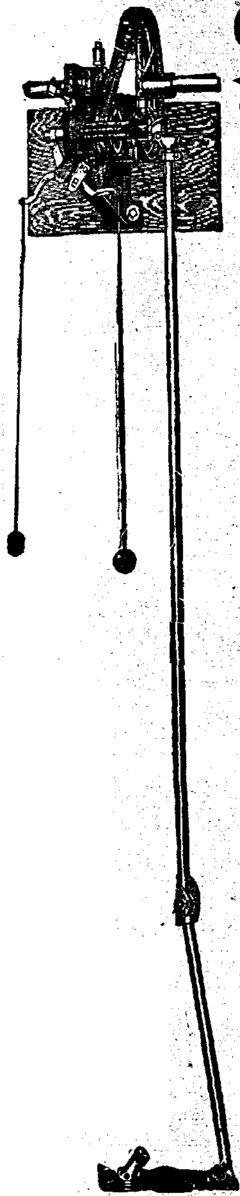

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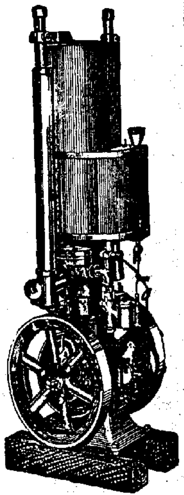

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